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**Final  
Archaeological Inventory Survey for  
Kamehameha Schools Kaka‘ako Block I,  
Honolulu Ahupua‘a, Honolulu (Kona) District, O‘ahu,  
TMKs: [1] 2-1-056:002, 007, and 008**

**Prepared for  
Kamehameha Schools**

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Kailua, Hawai‘i  
(Job Code: KAKAAKO 101)**

**October 2014**

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## Management Summary

<b>Reference</b>	Archaeological Inventory Survey for Kamehameha Schools Kaka'ako Block I, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu, TMKs: [1] 2-1-056:002, 007 and 008 (Tulchin et al. 2014)
<b>Date</b>	October 2014
<b>Project Number (s)</b>	CSH (Cultural Surveys Hawai'i, Inc.) Job Code: KAKAAKO 101
<b>Investigation Permit Number</b>	Fieldwork for this investigation was conducted under Hawai'i State Historic Preservation Division/Department of Land and Natural Resources (SHPD) permit No. 13-06 and 14-04, issued per Hawai'i Administrative Rules (HAR) §13-282.
<b>Project Location</b>	The project area is in downtown Honolulu in the area known as Kaka'ako, which is on the southern coastline of O'ahu. The project area is within the block bounded by Auahi Street, Ward Avenue, Ala Moana Boulevard, and Koula Street.
<b>Land Jurisdiction</b>	Private, Kamehameha Schools
<b>Agencies</b>	State Historic Preservation Division/Department of Land and Natural Resources (SHPD)
<b>Project Description</b>	<p>The project area is being proposed for redevelopment in alignment with the Hawaii Community Development Authority (HCDA) approved KS Kakaako Master Plan.</p> <p>Ground-disturbing construction activities associated with the project will include the demolition of existing structures, foundation slabs, and utility lines; implementation of new foundations, building footings, and retaining walls; and installation of new utility lines (water, electrical, sewer, and drain lines).</p>
<b>Project Acreage</b>	3.4 acres
<b>Historic Preservation Regulatory Context</b>	<p>The proposed development constitutes a project requiring compliance with and review under State of Hawai'i historic preservation review legislation (Hawai'i Revised Statutes [HRS] §6E-42 and HAR §13-284).</p> <p>At the request of the Kamehameha Schools, CSH completed this archaeological inventory survey investigation. It fulfills the requirements of the HAR §13-13-276 and was conducted to identify, document, and make site significance assessments of all historic properties within the project area, and to make mitigation recommendations. This document is intended to support the proposed project's historic preservation review under HRS §6E-42 and HAR §13-13-284, as well as the project's environmental review under HRS §343. It is also intended to support any project-related historic preservation consultation with stakeholders, such as state and county agencies and interested Native Hawaiian and community groups.</p>
<b>Fieldwork Effort</b>	Nigel Kingsbury, B.A., Nate Garcia, B.A., and Nifae Hunkin, B.A., assisted project director Jon Tulchin, B.A., with the field effort, which

	required 175 persondays to complete. Fieldwork took place between July 2013 and January 2014 under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator). Fieldwork consisted of a 100% pedestrian inspection of the project area. Following the pedestrian inspection, the historic property identification effort focused on a subsurface testing program.
<b>Number of Historic Properties Identified</b>	<p>Six archaeological historic properties were identified:</p> <ul style="list-style-type: none"> <li>• State Inventory Survey of Historic Properties (SIHP) # 50-80-14-7578, twentieth century cultural layer</li> <li>• SIHP # 50-80-14-7579, a twentieth century fill deposit and building foundations</li> <li>• SIHP # 50-80-14-7580, pre-Contact to post-Contact cultural layer with a historic burial cluster</li> <li>• SIHP # 50-80-14-7581, a pre-Contact traditional Hawaiian bundle burial</li> <li>• SIHP # 50-80-14-7582, disarticulated human skeletal remains within a non-burial context</li> <li>• SIHP # 50-80-14-7583, disarticulated human skeletal remains within a non-burial context</li> </ul>
<b>Effect Recommendation</b>	CSH's project specific effect recommendation is "effect, with proposed mitigation commitments." The proposed development will affect significant historic properties (SIHP #s -7578 through -7583) located within the project area.
<b>Mitigation Recommendation</b>	The recommended mitigation measures include burial treatment, archaeological monitoring, archaeological data recovery, and preservation.

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## Section 1 Introduction

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### 1.1 Project Background

At the request of Kamehameha Schools (KS), Cultural Surveys Hawai'i, Inc. (CSH) has prepared this archaeological inventory survey (AIS) for Kamehameha Schools Kaka'ako Block I, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu, TMKs: [1] 2-1-056:002, 007, and 008. The project area is in downtown Honolulu in the area known as Kaka'ako, on the southern coastline of O'ahu. The project area is within the block bounded by Auahi Street, Ward Avenue, Ala Moana Boulevard, and Koula Street. The project area is depicted on the 1998 Honolulu USGS 7.5-Minute Series Topographic Quadrangle (Figure 1), a tax map plat (Figure 2), and an aerial photograph (Figure 3).

The project area is being proposed for redevelopment in alignment with the Hawaii Community Development Authority (HCDA) approved KS Kakaako Master Plan. Ground-disturbing construction activities associated with the project will include the demolition of existing structures, foundation slabs, and utility lines; implementation of new foundations, building footings, and retaining walls; and installation of new utility lines (water, electrical, sewer, and drain lines).

### 1.2 Historic Preservation Regulatory Context and Document Purpose

The proposed development constitutes a project requiring compliance with and review under State of Hawai'i historic preservation review legislation (Hawai'i Revised Statutes [HRS] §6E-42 and Hawai'i Administrative Rules [HAR] §13-284).

At the request of the Kamehameha Schools, CSH completed this archaeological inventory survey investigation. It fulfills the requirements of the HAR §13-13-276 and was conducted to identify, document, and assess the significance of the historic properties within the project area. It also includes mitigation recommendations to address the project's impact on the identified significant historic properties. This document is intended to support the proposed project's historic preservation review under HRS §6E-42 and HAR §13-13-284, as well as the project's environmental review under HRS §343. It is also intended to support any project-related historic preservation consultation with stakeholders, including state and county agencies and interested Native Hawaiian and community groups.

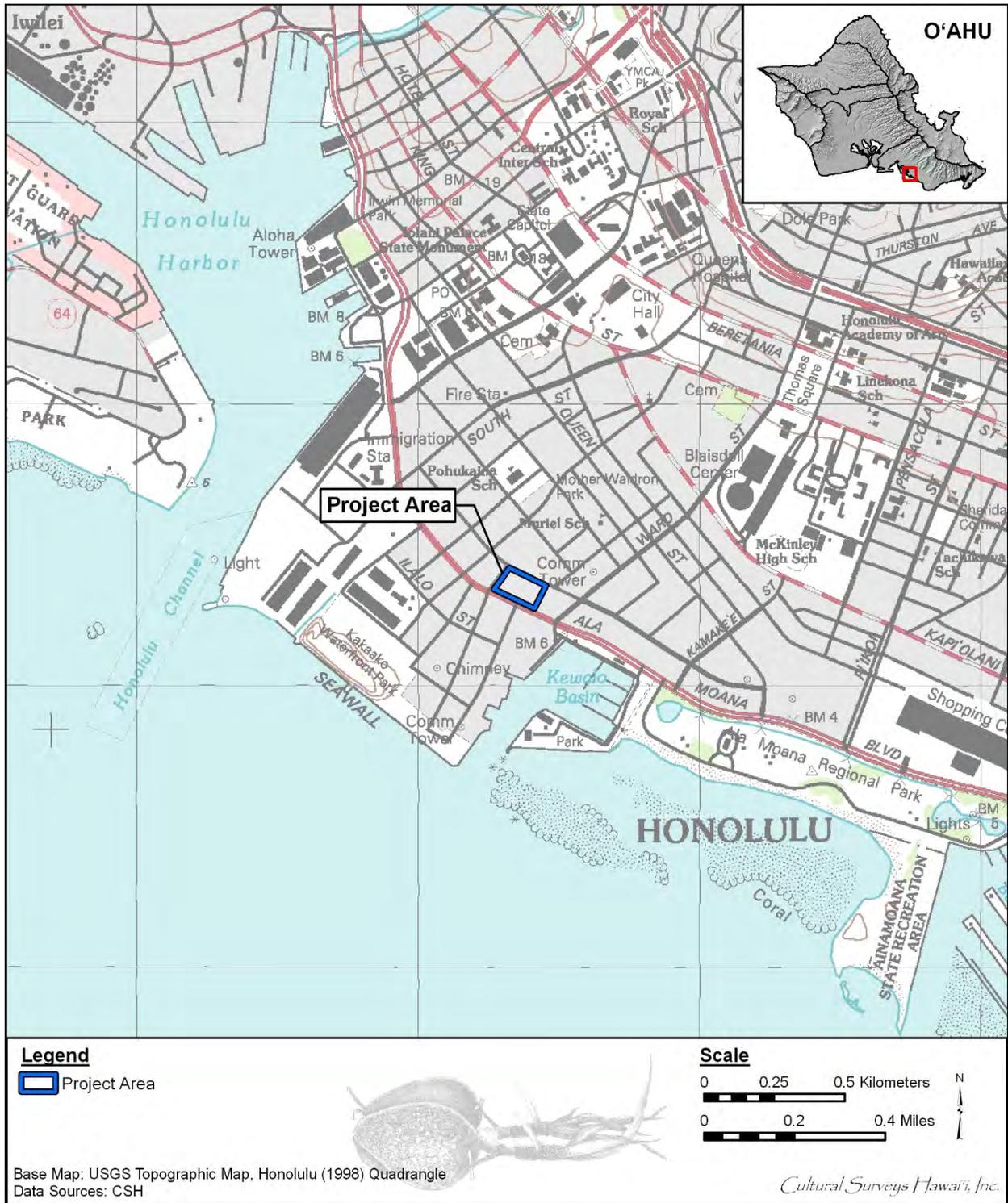


Figure 1. 1998 Honolulu USGS 7.5-Minute Series Topographic Quadrangle showing the project area location





Figure 3. Aerial photograph showing the project area location (source: Google Earth 2013)

## 1.3 Scope of Work

The following archaeological inventory survey scope of work is designed to satisfy the Hawai'i state requirements for archaeological inventory surveys (HAR §13-276):

1. Historic and archaeological background research included a search of historic maps, written records, Land Commission Award (LCA) documents, and reports from prior archaeological investigations. This research focused on the specific project area's past land use, with general background on the pre-Contact and historic settlement patterns of the *ahupua'a* and district. This background information was used to compile a predictive model for the types and locations of historic properties that could be expected within the project area.
2. A ground survey of the entire project area for the purpose of historic property identification and documentation. All historic properties were located, described, and mapped with evaluation of function, interrelationships, and significance. Documentation included photographs and scale drawings of selected historic properties. All historic properties were assigned State Inventory of Historic Properties (SIHP) numbers and located with a Trimble GPS. This GPS data will be in the report in ArcGIS format sufficient for planning purposes.
3. Based on the project area's environment and the results of the background research, subsurface testing with a combination of hand and backhoe excavation was conducted. Subsurface testing focused on locating and evaluating subsurface deposits, such as buried cultural layers and/or deposits with significant paleoenvironmental data, which may not have been located by the ground survey. Testing in sensitive areas was conducted by hand after the initial backhoe work. If appropriate samples from these excavations were found, they were analyzed for chronological and paleoenvironmental information. All subsurface historic properties identified were documented to the extent possible, including geographic extent, content, function/derivation, age, interrelationships, and significance.
4. Preparation of a survey report included the following:
  - a. A topographic map of the survey area showing all historic properties;
  - b. Description of all historic properties with selected photographs, scale drawings, and discussions of function;
  - c. Historical and archaeological background sections summarizing prehistoric and historic land use as they relate to the project area's historic properties;
  - d. A summary of historic property categories and their significance in an archaeological and historic context;
  - e. Recommendations based on all information generated that specifies what steps should be taken to mitigate impact of development on the project area's significant historic properties—such as data recovery (excavation) and preservation of specific areas. These recommendations will be developed in consultation with the client and State agencies.

## 1.4 Environmental Setting

### 1.4.1 Natural Environment

The project area is within a topographic section of O'ahu called the Honolulu Plain, an area generally less than 4.5 m, or 15 ft above sea level (Davis 1989:5). The Honolulu Plain is stratified with late-Pleistocene coral reef substrate overlaid with calcareous marine beach sand or terrigenous sediments, and stream fed alluvial deposits (Armstrong 1983:36). The top soil stratum consists of Fill land, mixed (F1), "containing areas filled with material dredged from the ocean and hauled from nearby areas" (Foote et al. 1972).

The modern Hawaiian shoreline configuration is primarily the result of 1) rising sea level following the end of the Pleistocene (Macdonald et al. 1983; Stearns 1978), 2) the mid- to late Holocene ca. 1.5-2.0 m high-stand of the sea (see summary in Dye and Athens 2000:18-19), and 3) pre-Contact and post-Contact human landscape modification. At the end of the Pleistocene, between approximately 20,000 and 5-6,000 years ago, water previously locked in glacial ice returned to the world's oceans, and the sea level rose over 100 m to approximately its current level. In the vicinity of the current project area, rising sea levels flooded the previously dry, earlier Pleistocene reef deposits, which had formed hundreds of thousands of years previously when sea level was comparable to modern levels. When sea levels reached approximately modern levels, the now coastal regions became depositional environments where for tens of thousands of years previously, during the lower sea levels, they had been erosional environments.

A high stand of the sea for the Hawaiian Islands, ca. 1.5 to 2.0 m above present sea level, has been well documented between 4,500 and 2,000 years ago (Athens and Ward 1991; Fletcher and Jones 1996; Grossman and Fletcher 1998; Grossman et al. 1998; Harney et al. 2000; Stearns 1978). During this high stand, there appears to have been an increase in coral reef production and the production of detrital reef sediments. Littoral environments appear to have been augmented substantially by the deposition of marine sediments. "What this means is that the great shoreline sand berms must have developed around the islands at this time because this was when calcareous sand was being produced and delivered to the shorelines in large quantities" (Dye and Athens 2000:19).

The Honolulu coastline was likely greatly affected by the deposition of marine sediments during this elevated sea level. The subsequent drop in sea level to its present level, ca. 2,000 years ago, most likely created a slightly erosional regime that may have removed sediments deposited during the preceding period of deposition (Dye and Athens 2000:19). However, the net gain in sediments would have been substantial. In 1911, it was estimated that about one-third of the Honolulu Plain was a wetland (Hawaiian Territory Sanitary Commission report in Nakamura 1979:65). Pre-Contact Hawaiians used the lagoonal/estuary environment of the Honolulu plain to construct fishponds. Fishpond walls served as sediment anchors for the accumulation of detrital reef sediments. They also likely affected long shore sedimentary transport, resulting in new littoral deposition and erosion patterns. In the post- Western Contact period, when the fishponds were no longer utilized, they became obvious locations for the deposition of fill. These reclaimed/landfill areas provided valuable new land near the heart of growing urban Honolulu.

The undeveloped natural condition of the vicinity consisted of low-lying marshes, tidal flats, fishponds, and reef areas. Beginning in the late nineteenth century, these low-lying areas were

filled in and then developed, which permanently changed the area into its present fully-urbanized character. Foote et al. (1972) show the entire project area as being Fill land, mixed (FL) (Figure 4). The authors provide the following description of this soil series:

Fill land, mixed (FL)—This land type occurs mostly near Pearl Harbor and in Honolulu, adjacent to the ocean. It consists of areas filled with material dredged from the ocean or hauled from nearby areas, garbage, and general material from other sources. [Foote et al. 1972:31]

In this area of the Honolulu District, rainfall averages less than 30 inches per year (Armstrong 1983:62). Northeasterly trade winds prevail throughout the year, although their frequency varies from more than 90% during the summer months to 50% in January; the average annual wind velocity is approximately 10 miles per hour (Wilson Okamoto 1998). Vegetation within the project area is limited to a few ornamental trees in grass parking lot dividers and along the project area margins.

#### **1.4.2 Built Environment**

The project area is located within central Honolulu and is surrounded by modern urban development including asphalt paved streets, concrete sidewalks, and utility infrastructure. A majority of the project area consists of asphalt paved parking lots, with several existing buildings, structures and associated infrastructure (see Figure 3).

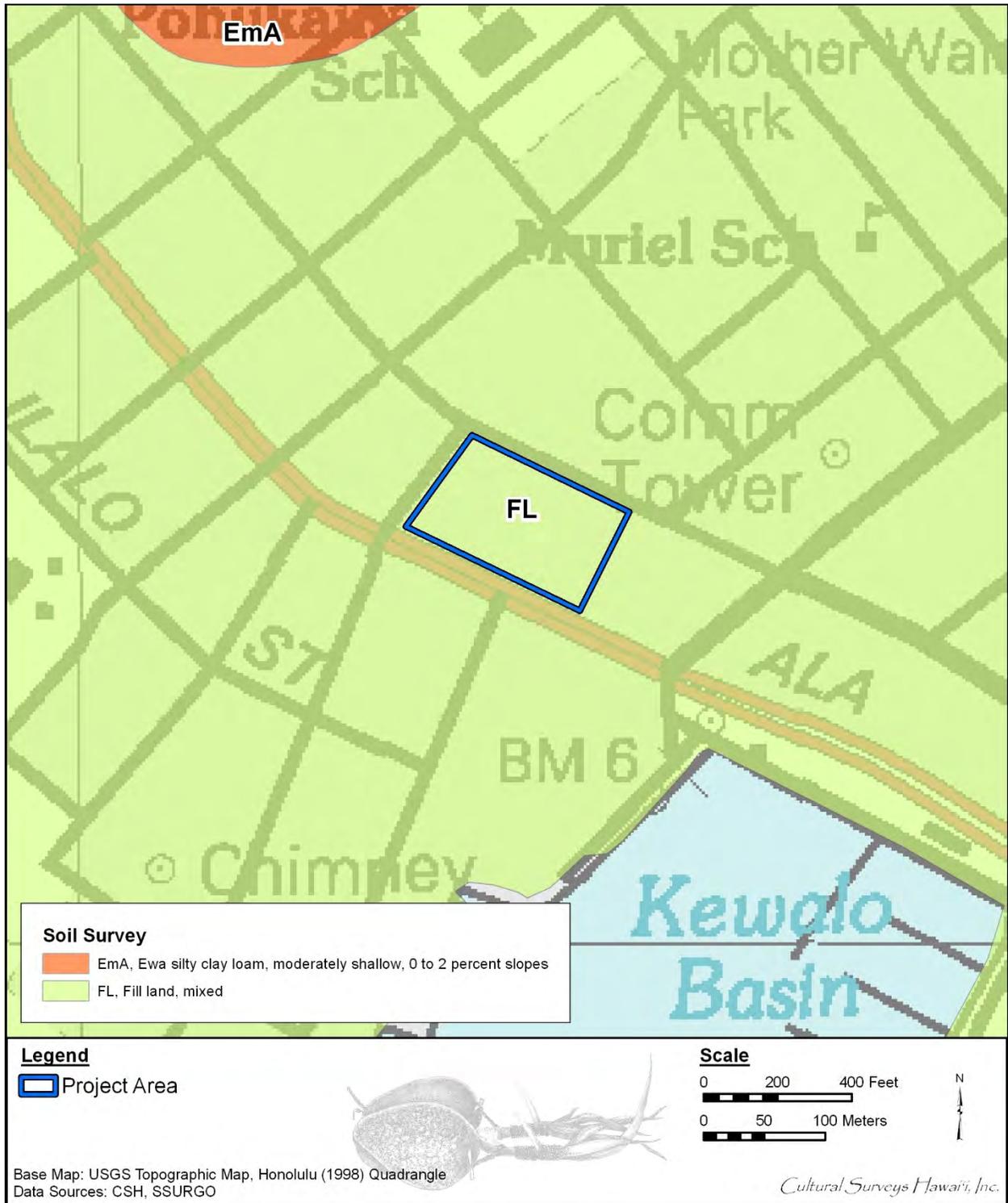


Figure 4. Soil survey geographic (SSURGO) database overlay (source: Foote et al. 1972)

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## Section 2 Methods

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### 2.1 Field Methods

The research design for this archaeological inventory survey was developed in consultation with and in concurrence by SHPD (LOG NO. 2013.3486, DOC. NO. 1305SL43; see Appendix A). Fieldwork for this investigation involved a 100% pedestrian inspection of the project area to ascertain the age of standing architecture and whether there are surface historic properties. Following the pedestrian inspection, the archaeological fieldwork focused on a program of pre-demolition subsurface testing with a combination of machine-assisted and hand excavation trenching. The purpose of subsurface testing was to assess the stratigraphy and potential for subsurface historic properties within the project area. The testing program also focused on characterizing the remnants of the project area's buried land surfaces that predate historic and/or modern fill layers, as the older land surfaces are more likely to be associated with significant cultural deposits. Historic is defined as anything older than 50 years and modern is defined as anything younger than 50 years.

The subsurface testing program initially consisted of 46 machine-assisted test excavations (TE), each measuring 6 m long by 0.8 m wide, for a total surface excavation of approximately 221 sq m (Figure 5). However, upon the identification of burial finds in TE 25 and TE 40, an additional 195 sq m was excavated in order to better delineate the horizontal extent of the subsurface cultural deposits and burial finds (Figure 6 and Figure 7). This expansion of subsurface testing consisted of the excavation of 15 additional test excavations of varying size, increasing the total surface area of excavation to 416 sq m or approximately 3.0% of the total project area.

#### 2.1.1 Field Personnel

Nigel Kingsbury, B.A., Nate Garcia, B.A. and Nifae Hunkin, B.A. assisted project director Jon Tulchin, B.A. with the field effort, which required 175 persondays to complete. Fieldwork took place between July 2013 and January 2014 under the general supervision of Hallett H. Hammatt, Ph.D. (principal investigator).

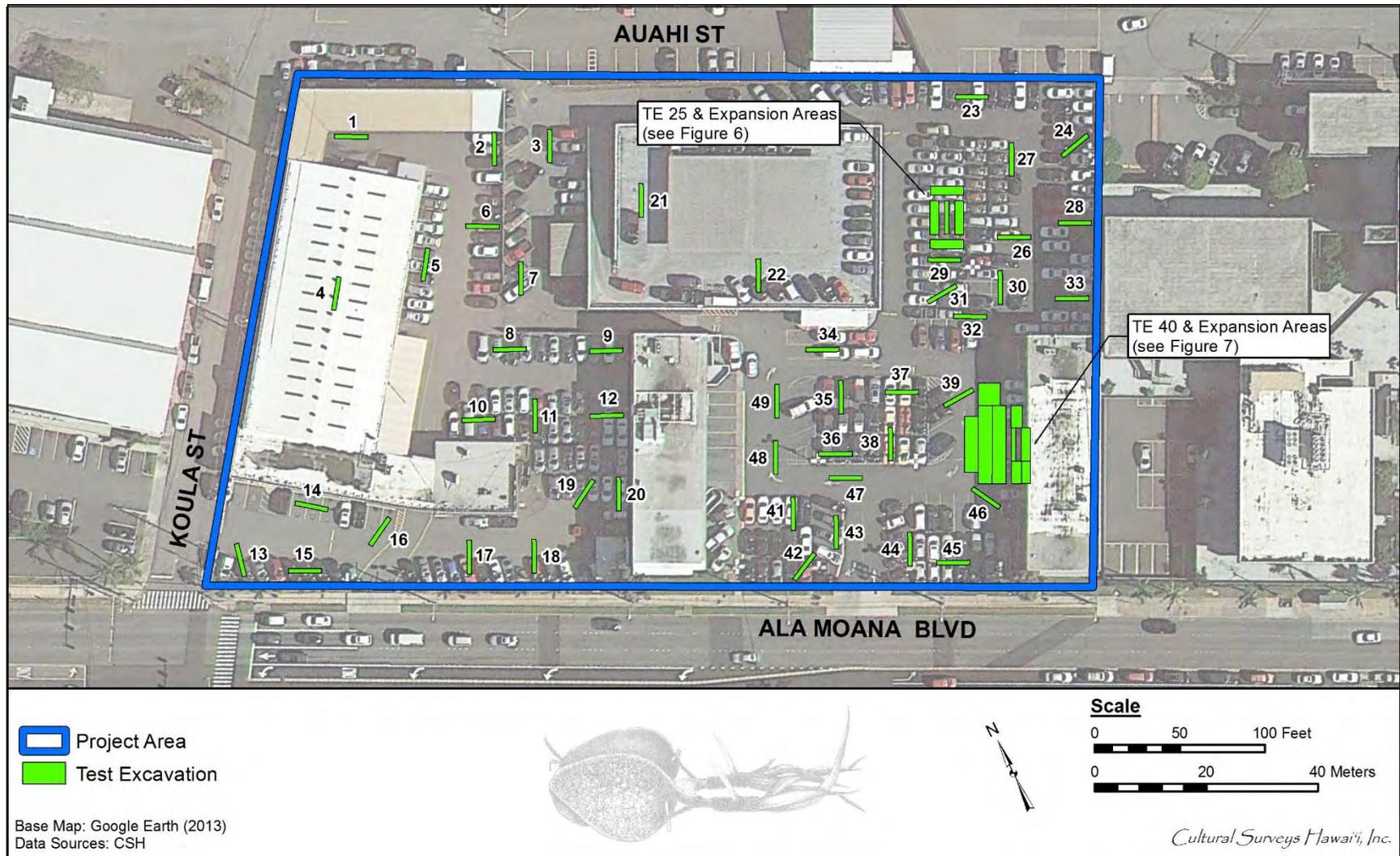


Figure 5. Distribution of test excavations throughout the project area

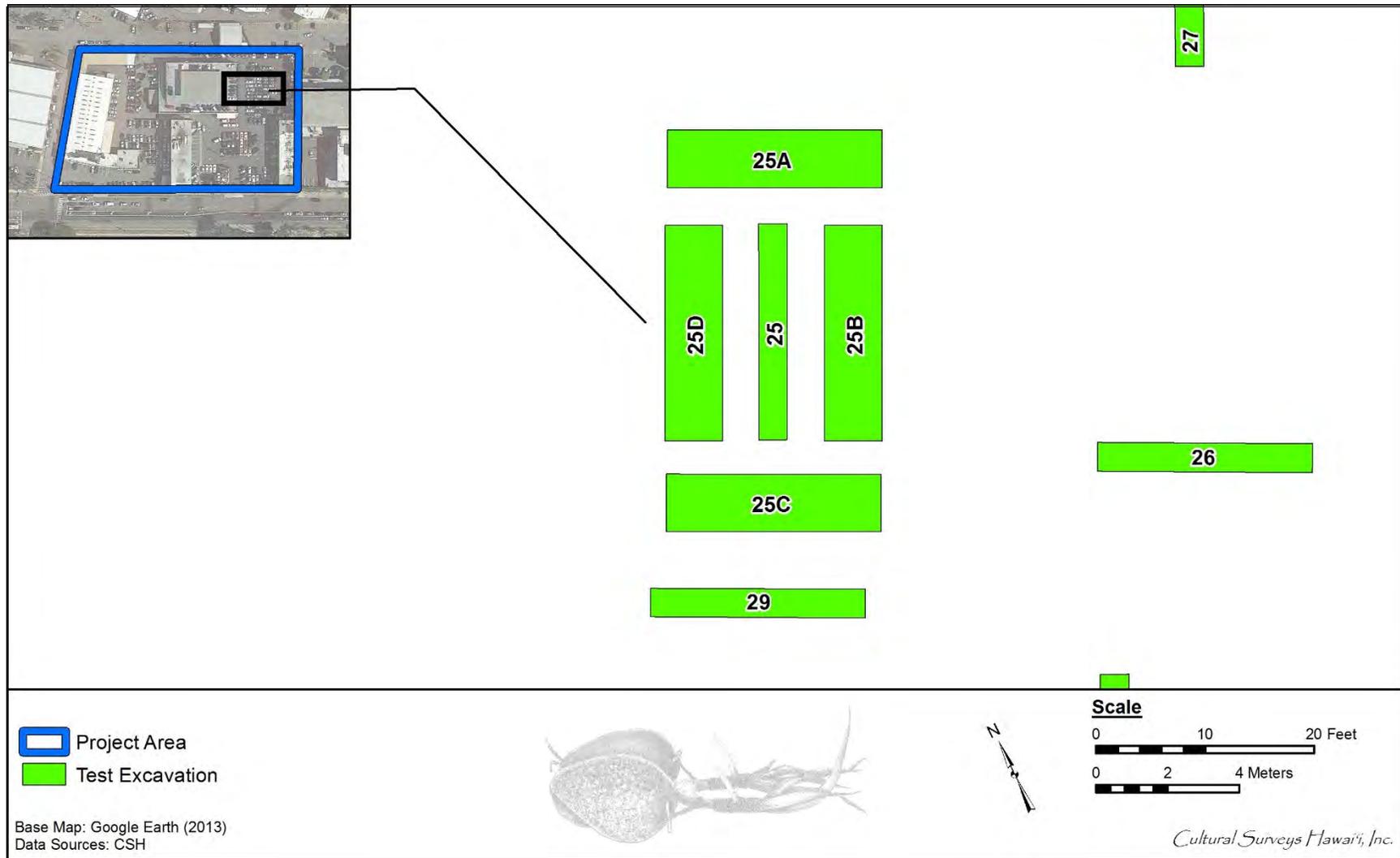


Figure 6. Test Excavation 25 expansion areas

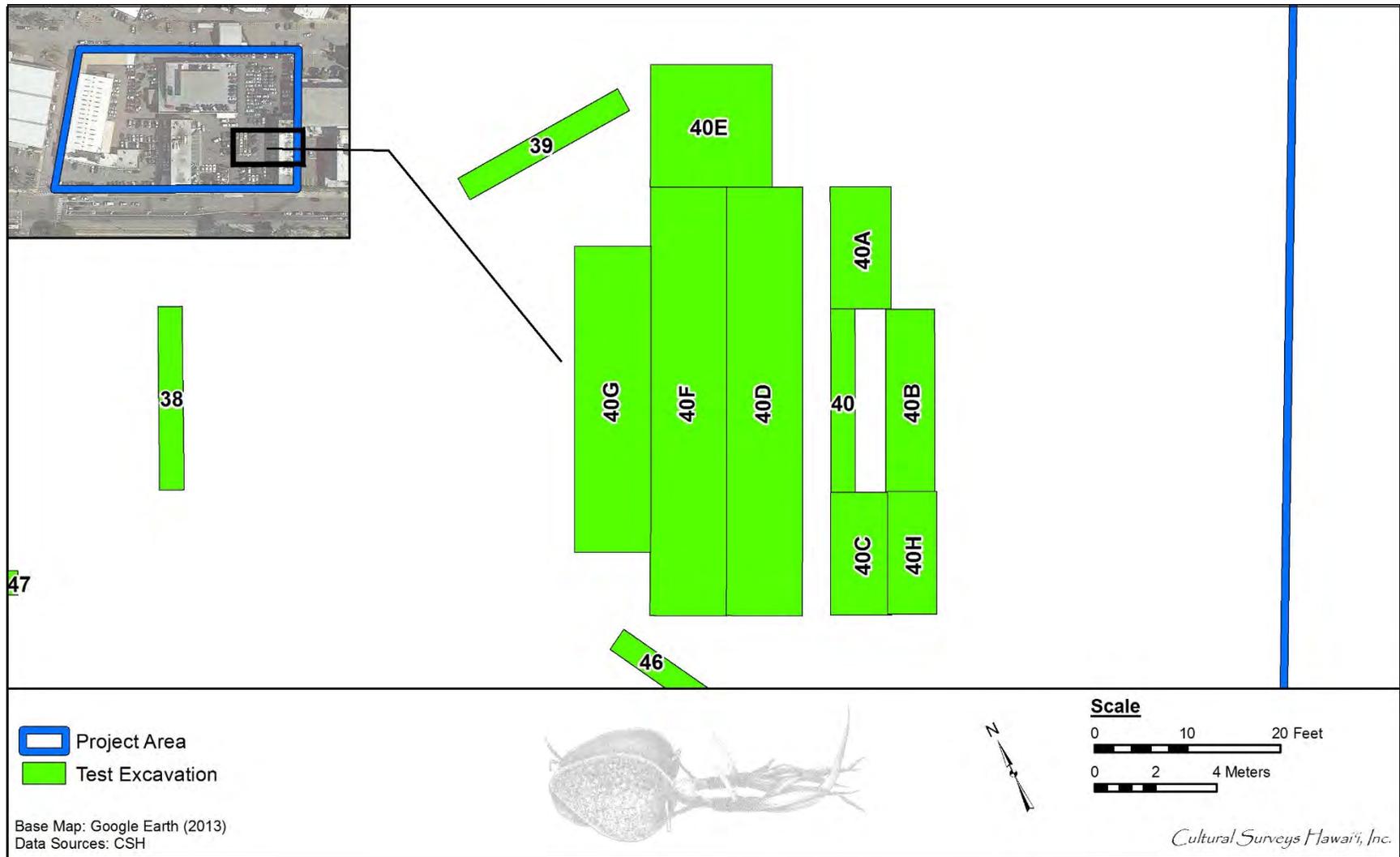


Figure 7. Test Excavation 40 expansion areas

## 2.1.2 Subsurface Testing

Trench excavation initially consisted of saw cutting of asphalt and concrete surfaces. A standard backhoe with a 2-ft wide bucket was used to excavate at least portions of each test excavation. Test excavations were excavated to sterile deposits and/or down to the coral shelf.

At least two archaeologists monitored all machine excavation. A monitor was positioned at either end of the trench to observe both the removal of sediment from the trench and the emptying of the excavator bucket on the adjacent back dirt pile.

### 2.1.2.1 Documentation of Stratigraphy

The stratigraphy in each trench was drawn and photographed. Sediments were described for using U.S. Department of Agriculture soil description observations/terminology. Sediment descriptions include Munsell color, texture, consistence, structure, plasticity, cementation, origin of sediments, descriptions of any inclusions such as cultural material and/or roots and rootlets, lower boundary distinctiveness and topography, and other general observations. Burial pits and other cultural features were represented on trench profiles and/or plan views, some samples were collected, and photographs were taken.

Identified stratigraphic layers were designated with Roman numerals based on discrete depositional events. For example imported fill layer associated with modern development were assigned Stratum I and historic land reclamation fill layers were designated Stratum II. If more than one layer was associated with a discrete depositional event then they were assigned as substrata to the primary stratum designation associated with that event (ex. Stratum Ia, Stratum Ib, etc.).

### 2.1.2.2 Sampling

The sampling of subsurface cultural layers and/or subsurface pit features was carried out to characterize the cultural content of these layers/features. Sampling also helped establish geographic boundaries to these layers and the general time frame of their deposition (pre-Contact, post-Contact, or modern).

SIHP #s -7578, -7579, and -7580 were the focus of sampling efforts, with Table 1 to Table 3 showing the distribution of sampling efforts for these historic properties.

Cultural material was only collected if diagnostic artifacts were identified or if adequate concentrations of charcoal or midden were encountered that could be utilized to provide additional information about site chronology and function. Cultural material that was not collected was noted in stratigraphic descriptions and test excavation descriptions. All collected cultural materials were bagged by provenience, and transferred to the CSH laboratory for analysis.

#### 2.1.2.2.1 SIHP # 50-80-14-7578

Sampling at SIHP # -7578 concentrated on identified subsurface pit features (see Table 1). Sampling at SIHP # -7578 did not involve screening of sediment from pit features or cultural layers, but instead involved the collection of “grab samples” from hand and machine excavated sediments. Once an adequate amount of cultural material was collected to make a determination

Table 1. Distribution of Cultural Layer/Pit Feature Sampling for SIHP 7578

Test Excavation	SIHP 7578		
	Cultural Layer Sampled	Feature Designation	Sampled
TE 8	-	A	X
TE 9	-	-	-
TE 12	-	B	X
TE 18	X	-	-
TE 19	-	C	X
TE 20	-	D	X
		F	X
TE 25	-	G	X
TE 25A	-	I	X
TE 25B	-	-	-
TE 25C	-	J	X
TE 25D	-	-	-
TE 28	-	H	X
TE 40A	-	-	-
		-	-
		-	-
TE 40B	-	-	-
		-	-
		-	-
TE 40C	-	-	-
TE 40D	-	-	-
		-	-
TE 40E	-	-	-
		-	-
		K	X
TE 40F	-	-	-
TE 40G	-	-	-
TE 40H	-	-	-
TE 48	-	L	X
		M	X
TE 49	-	N	X
		O	X
TEs 25, 25A-25D, 40B-40H, 49	-	P	-

Table 2. Distribution of Cultural Layer Sampling for SIHP 7579

<b>Test Excavation</b>	<b>SIHP 7579</b>
	<b>Cultural Layer</b>
<b>TE 40</b>	-
<b>TE 40A</b>	-
<b>TE 40B</b>	X
<b>TE 40C</b>	X
<b>TE 40D</b>	X
<b>TE 40E</b>	-
<b>TE 40F</b>	-
<b>TE 40G</b>	X
<b>TE 40H</b>	-
<b>TE 41</b>	-
<b>TE 42</b>	-
<b>TE 44</b>	-
<b>TE 45</b>	-
<b>TE 46</b>	-
<b>TE 47</b>	-

Table 3. Distribution of Cultural Layer/Pit Feature Sampling for SIHP 7580

Test Excavation	SIHP 7580		
	Cultural Layer Sampled	Feature Designation	Sampled
TE 5	-	-	-
TE 8	-	A	X
TE 9	-	B	X
TE 11	-	-	-
TE 12	-	Subfeatures 1-4	-
TE 20	-	-	-
TE 32	-	C	X
		D	-
TE 35	-	-	-
TE 36	-	-	-
TE 37	X	-	-
TE 38	X	E	-
		Subfeatures 5-6	-
TE 39	X	F	-
		Subfeatures 7	-
TE 40	-	-	-
TE 40A	-	G	X
TE 40B	-	Subfeature 8	-
		Subfeature 9	-
		Subfeature 10	X
		Subfeature 11	X
TE 40C		H	X
		Subfeatures 12	-
TE 40D		I	X
		J	X
		K	X
		L	X
		M	X
		N	X
		Subfeature 13-16	-
TE 40E		O	-
		P	-
TE 40F		Q	X
		R	X
		S	X
		T	-
		U	X
TE 40G		V	-

Test Excavation	SIHP 7580		
	Cultural Layer Sampled	Feature Designation	Sampled
		W	-
		X	X
		Y	X
		Z	-
		Subfeature 17	X
TE 40H	-	-	-
TE 43	X	-	-
TE 44	X	-	-
TE 45	X	-	
TE 46	-	Subfeature 18	X
TE 47	-	AA	X

of the age, function, and extant of SIHP # -7578, it was decided to cease collection of the observed cultural material and to only note and/or photograph it instead.

#### 2.1.2.2.2 SIHP # 50-80-14-7579

Sampling at SIHP # -7579 concentrated on the culturally enriched fill layer as no pit features were identified (see Table 2). Sampling at SIHP # -7579 did not involve screening of sediment, but instead involved the collection of “grab samples” from hand and machine excavated sediments. Once an adequate amount of cultural material was collected to make a determination of the age, function, and extant of SIHP # -7579, it was decided to cease collection of the observed cultural material and to only note and/or photograph it instead.

#### 2.1.2.2.3 SIHP # 50-80-14-7580

Sampling at SIHP # -7578 was focused on both identified subsurface pit features and the greater cultural layer in which the pit features originated (see Table 3). The samples were excavated out of the sidewall or from the base of the excavation, into approximately 20-liter (5-gallon) buckets. The sediment was then screened through 3.2 mm (1/8-inch) mesh. The amount of sediment sampled was determined by the type and amount of cultural content observed upon initial sampling (i.e., if diagnostic artifacts and/or large quantities of charcoal and/or midden were observed at a particular location, then sampling would continue in that area until the observed cultural content of the sample area returned to the average yield observed elsewhere throughout the cultural layer.). Once an adequate amount of cultural material was collected to make a determination of the age, function, and extant of SIHP # -7580, it was decided to cease collection of the observed cultural material and to only note and/or photograph it instead.

#### 2.1.2.3 Identification of Cultural Layers

Cultural layers are identified as stratigraphic layers containing evidence of cultural activity. Typically the presence of charcoal flecking, artifacts, midden, and pit features located within a stratigraphic layer facilitate its designation as a cultural layer.

Stratigraphic documentation and the results of sampling of specific layers confirmed the existence and content of cultural layers.

The geographic extent of identified cultural layers was determined by whether cultural layers were either present or absent in test excavations. There was no attempt to interpolate the boundaries beyond the immediate areas excavated as subsurface testing indicated the potential for modern and historic disturbances to have impacted (i.e., removed) cultural deposits that may have been present in areas not subject to testing.

#### 2.1.2.4 Pit Features

Pit features were identified and labeled as distinct cultural intrusions extending from modern or buried A horizons into underlying culturally sterile layers. Alphabetic feature designations (e.g., Feature A) were assigned to the most clearly defined and distinct pit features, pit features that had a clearly defined function (i.e., fire pits, foundation excavations, etc.). Numeric subfeature designations (e.g., Subfeature 1) were assigned to postmolds and to pit features of unknown function.

Sediments from selected recorded pit features were sampled and screened through 3.2 mm (1/8-inch) mesh. Pit features were depicted in trench profiles and/or plan views, and information was collected regarding their shape, content, distinctness, and degree of protrusion into underlying culturally sterile layers.

#### 2.1.2.5 Global Positioning System Documentation

The location of each of the trenches and significant features were recorded using a Trimble Pro XR mapping grade GPS unit with a TSCI Datalogger and real-time differential correction. This unit provides sub-meter horizontal accuracy in the field. GPS field data will be post-processed, yielding horizontal accuracy between 0.5 and 0.3 m. GPS location information will be converted into GIS shape files using Trimble's Pathfinder Office software, version 5.20, and graphically displayed using ESRI's ArcGIS 10.2.

## 2.2 Laboratory Methods

### 2.2.1 Wood Taxa Identification

Six charcoal samples collected from SIHP # 50-80-14-7580 were submitted to the International Archaeological Research Institute, Inc. (IARII) for wood taxa identification (see Appendix B). The sample selection involved submitting samples that were spread out across the site to ensure good geographic distribution; additionally, the samples were collected from both the cultural layer and from discrete features. The freshly fractured transverse and tangential facets of each charcoal piece were viewed under magnification of a dissecting microscope. Taxa identifications were made by comparing the anatomical characteristics seen during examination against those of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai'i, and published descriptions (Murakami 2013).

### 2.2.2 Radiocarbon Dating

Five samples of charcoal were sent to Beta Analytic, Inc. of Miami, Florida for radiocarbon dating analysis. The samples were selected from charcoal that was initially submitted for wood taxa identification. Samples were preferred to have been selected from identifiable charcoal, and from short lived species; however some samples were sent from unknown species (where no wood taxa could be identified) in order to obtain a good geographic distribution of radiocarbon dates. The samples used the Accelerator Mass Spectrometer method of analysis. Appendix C shows the Beta Analytic results. The resulting conventional radiocarbon ages were calibrated into calendar ages AD using the OxCal Calibration Program, version 3.9, developed by the Oxford Radiocarbon Accelerator Unit (ORAU) and available as shareware over the Internet.

### 2.2.3 Midden and Artifact Analysis

Invertebrate remains collected from selected subsurface features or cultural layers were identified to genus and species, weighed, and analyzed. Data were tabulated by depth and stratigraphic unit. Common marine shells were identified and analyzed at the Cultural Surveys Hawai'i laboratory in Waimanalo, O'ahu using an in-house comparative collection and reference texts (e.g., Abbott and Dance 1990; Eisenberg 1981; Kay 1979; Titcomb 1972, Titcomb 1979).

Traditional Hawaiian materials collected were sorted, identified, measured, quantified, and photographed to scale. In general, artifact analysis focused on establishing, to the greatest extent

possible, material type, formal/function type, cultural affiliation and/or age of manufacture. The forms and functions were determined using reference material (e.g., Barrera and Kirch 1973; Brigham 1974; Buck 2003; Emory et al. 1968).

Historic artifacts collected were sorted, identified, measured, quantified, and photographed to scale. Artifact analysis focused on the function and manufacturing dates of the items, using reference texts (e.g., BLM/SHA 2013; Elliott and Gould 1988; Fike 1987; Lebo 1997; Lister and Lister 1989; Millar 1988; Munsey 1970; Toulouse 1971; Zumwalt 1980).

A catalogue of all collected artifacts is presented in Section 5 Results of Laboratory Analysis.

#### **2.2.4 Energy-Dispersive X-Ray Fluorescence (EDXRF)**

All appropriate collected lithics were submitted to Dr. Peter Mills of the University of Hawai'i at Hilo for EDXRF analysis in an attempt to source lithic artifacts collected during excavation.

Dr. Mills has offered the following comments regarding sample selection and preparation:

Clean flakes that are around 2 cm in diameter are best, but we can run much larger flakes and adzes as well. Smaller flakes can also be run with somewhat less precision and a great deal more work (we have to use a 'collimator' on the spectrometer, and run the samples using a different method). Polished adze flakes and finished adzes have the greatest potential for identifying non-local resources because many initial adze blank production flakes would logically be from local sources only. [Dr. Mills, personal communication]

### **2.3 Document Review**

Background research included a review of previous archaeological studies on file at SHPD; review of documents at Hamilton Library of the University of Hawai'i at Mānoa, the Hawai'i State Archives, the Mission Houses Museum Library, the Hawai'i Public Library, and the Bishop Museum Archives; study of historic photographs at the Hawai'i State Archives and the Bishop Museum Archives; and study of historic maps at the Survey Office of the Department of Land and Natural Resources. Historic maps and photographs from the CSH library were also consulted. In addition, Māhele records were examined from the Waihona 'Aina database (Waihona 'Aina 2000).

This research provided the environmental, cultural, historic, and archaeological background for the project area. The sources studied were used to formulate a predictive model regarding the expected types and locations of historic properties in the project area.

## Section 3 Background Research

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### 3.1 Traditional and Historical Background

#### 3.1.1 Mythological and Traditional Accounts

##### 3.1.1.1 Brief Overview for Kaka‘ako

The current urban district known as Kaka‘ako is significantly larger than the traditional area of the same name, which is described in mid-nineteenth century documents and maps as a small *‘ili* (traditional land unit). In addition to Kaka‘ako, the present Kaka‘ako area included lands once known as Ka‘ākaukukui, Kukuluāe‘o, and Kewalo, and even smaller areas—possibly portions of *‘ili*—called Kawaiaha‘o, Honuakaha, Pu‘unui, Ka‘ala‘a, ‘Āpua, and ‘Auwaiolimu. The current project area is within the *‘ili* of Ka‘ākaukukui.

The original location and extent of an area called Kaka‘ako was, based on maps and ethnographic information, close to present day South Street. The ethnographer Henry Kekahuna (1958:4), who was born in Hawai‘i in 1891 and was a long-time resident of Honolulu, placed it “on the Ewa side of Kuloloia Stream where the Honolulu Iron Works and Fort Armstrong are now,” an area now covered by One Waterfront Plaza.

##### 3.1.1.2 Place Names

Place name translations presented without attribution in this subsection are from *Place Names of Hawaii* (Pukui et al. 1974). The researchers for this book based their interpretations not only on literal (phonetic) translations of the words, but also on oral traditions and historic documents. In this work, the place names of geographic features and *ahupua‘a* names are translated; however, *‘ili* names (small land divisions within *ahupua‘a*) are not usually presented.

Thomas Thrum also published a short paper on place names in the 1922 edition of Lorrin Andrews’ *A Dictionary of the Hawaiian Language* (2003), based only on the phonetic translations of the place names. This work does have a large number of translated *‘ili* names. Because there are no oral or written documents to confirm Thrum’s interpretations, Mary Pukui (Pukui et al. 1974:136) cautioned that Thrum’s translations were sometimes “unreliable.” Thrum’s translations will be presented here since it is our only source for many *‘ili* names, but Pukui’s cautionary note for these interpretations should be kept in mind.

Pukui et al. (1974) do not give a meaning for the place name **Kaka‘ako**, but the Hawaiian word *kākā‘āko* can be translated as “dull, slow” (Pukui and Elbert 1986:110). Thrum (1923:639) translated the word as “prepare the thatching” (*kākā* = to chop, beat, or thresh; *ako* = thatch). If Thrum’s translation is correct, it could be related to the fact that salt marshes, such as areas like Kaka‘ako, were excellent places to gather tall *pili* grass, which Hawaiians traditionally used to thatch their houses.

According to Kekahuna (1958:4), **Ka‘ākaukukui** was “a beautiful sand beach that formerly extended along Ala Moana Park to Kewalo Basin, a quarter mile long reef extended along the shore.” Pukui et al. (1974) describe Ka‘ākaukukui as a [f]illed-in reef. The name means “the right (or north) light,” and it may have referred to a maritime navigation landmark. Thrum (1923:635) translates it as “radiating place for lamp.” In the early twentieth century, it was translated as “to the right of the

lighthouse” by the squatters who lived in the area (Gessler 1938:187). This would have been an accurate description of the area at that time as Ka‘ākaukukui was east, or “to the right,” of the Honolulu Lighthouse in the harbor. However, this is probably a historic, not an ancient, interpretation as the Honolulu Lighthouse was not built until 1869 (Dean 1991:7).

**Kukuluāe‘o**, translates literally as the “Hawaiian stilt (bird),” *Himantopus himantopus*, and from the word *kukuluāe‘o*, which means “to walk on stilts.” Pukui et al. (1974) described the area as “formerly fronting Ke-walo Basin” and “containing marshes, salt ponds, and small fishponds,” an environment well suited for this type of bird (Griffin et al. 1987:36). Kekahuna (1958:4) described it as “the land on the upland side of Ka‘ākaukukui. Salt was formerly made there.”

**Kewalo** literally means “the calling (as an echo).” Land Commission and other historic-era documents identify it as the area between Cooke and Sheridan streets, *mauka* of Queen Street and the coastal sections of Ka‘ākaukukui, Kukuluāe‘o, and Kālia. According to Pukui et al. (1974:109), “outcasts (*kauwā*) intended for sacrifice were drowned here” (see *mo‘olelo* below). Kekeahuna (1958) said that at one time it also had a sand beach as a part of the area where various sports such as surfing were held.

### 3.1.1.3 Mo‘olelo Associated with Place Names

The present study area is generally located in a region known as Ka‘ākaukukui. It is *makai* (seaward) of Kewalo on early historic maps and west of the land called Kukuluāe‘o. The names Ka‘ākaukukui and Kukuluāe‘o do not appear in any citations in *Hawaiian Island Legends Index* or in the index to *Fornander’s Collection of Hawaiian Antiquities and Folklore*. There are a few mentions of the place names Kewalo and Kaka‘ako in various legends and traditions. Kaka‘ako and Kukuluāe‘o are mentioned in some post-contact Chants.

From these legendary accounts it can be seen that Ka‘ākaukukui, Kukuluāe‘o, and Kewalo were traditionally noted for their fishponds and salt pans, for the marsh lands where *pili* grass and other plants could be collected, for ceremonial sites such as Pu‘ukea Heiau, Kewalo Spring, and Kawailumalumi Pond at which sacrifices were made, and for their trails that allowed transport between the more populated areas of Waikīkī and Honolulu. Important chiefs were born in the area and conducted religious rites, and commoners traveled to the area to procure food and other resources; some commoners probably also lived in the area, possibly adjacent to the ponds and the trails.

Kaka‘ako is mentioned in Thrum’s version of the legend of Kū‘ula, the god presiding over the fish, and his son ‘Ai‘ai, who was the first to teach the Hawaiians how to make various fishing lines and nets, the first to set up a *ko‘a kū‘ula*, a rock shrine on which the fishermen would place their first catch as an offering to Kū‘ula, and the first to set up *ko‘a ia*, fishing stations where certain fish were known to gather. Leaving his birthplace in Maui, ‘Ai‘ai traveled around the islands, establishing *ko‘a kū‘ula* and *ko‘a ia*. On O‘ahu, he landed first at Makapu‘u in Ko‘olaupoko, then traveled clockwise around the island.

Aiai came to Kalia [Waikīkī] and so on to **Kakaako**. Here he was befriended by a man named Apua, with whom he remained several days, observing and listening to the murmurs of the chief named Kou. This chief was a skillful haiku [*Katsuwonus pelamis*; bonito] fisherman, his grounds being outside of Mamala until you came to

Moanalua. There was none so skilled as he, and generous withal, giving akus to the people throughout the district. [Thrum 1998:242]

Ka'ākaukukui is briefly mentioned in the legend of Hi'iaka, beloved sister of the Hawaiian volcano goddess, Pele. Hi'iaka and her companions had been traveling around O'ahu on the land trails, but decided to travel from Pu'uloa (on Pearl Harbor in 'Ewa) to Waikīkī by canoe. At Pu'uloa, Hi'iaka met a party who were planning on traveling to the house of the chiefess Pele'ula in Waikīkī. Hi'iaka recited a chant, telling the people that although they were going by land and she was going by sea they would meet again in Kou (ancient name of Honolulu). One portion of the chant mentions the place Ka'ākaukukui, with reference to a pool, possibly a reference to the salt ponds of the area:

<i>A pehea lā au, e Honoka'upu, ku'u aloha</i>	And what of me, O Honoka'upu, my love
<i>I ka welelau nalu kai o Uhi, o 'Ōa</i>	Upon the crest of the surf at Uhi and 'Ōa
<i>'O nā makai ke ao (pō) o pōina</i>	Eyes in the living realm (night) of oblivion
<i>Ma hea lā wau, e ke aloha lā</i>	Where am I, O my love
<i>'O Kou ka papa</i>	Kou is the coral flat

<i>'O Ka'ākaukukui ka loko</i>	<b>Ka'ākaukukui</b> is the pool
<i>'O ka 'alamihi a'e nō</i>	Some 'alamihi indeed
<i>'O ka lā a pō iho</i>	Wait all day until night
<i>Hui aku i Kou nā maka.</i>	Friends shall meet in Kou.

[Ho'oulumāhie 2006a:297; Ho'oulumāhie 2006b:277]

The exact meaning of the word 'alamihi within this chant is unknown. 'Alamihī is the name of a native Hawaiian small black crab (*Metopograpsus thukuhar*), a scavenger often associated in Hawaiian sayings with corpse-eating (Pukui and Elbert 1986:18). *Alamihī* is also used as a place name that can mean "path [of] regret" (Pukui et al. 1974:9).

#### 3.1.1.4 Trails

John Papa 'Ī'ī addresses some of the place names mentioned previously while discussing early nineteenth century trails in the Honolulu/Waikīkī area. Because this area was characterized by ponds, marshlands, and *lo'i*, any trails near the coastline must have run on a sand berm raised above surrounding wetlands and coral flats. Regarding the middle trail (probably close to the current alignment of Queen Street), walking from Waikīkī to Honolulu, 'Ī'ī stated,

The trail from Kalia led to Kukuluaeo, then along the graves of those who died in the smallpox epidemic of 1853, and into the center of the coconut grove of Honuakaha. On the upper side of the trail was the place of Kinau, the father of Kekauonohi. ['Ī'ī 1959:89]

The grave site referred to is the Honuakaha Cemetery at the *makai* corner of Halekauwila and South streets, *makai* of Kawaiaha'o Church. Honuakaha was a settlement located generally between Punchbowl and South streets, on the *makai* side of Queen Street. On the lower, coastal trail, walking from Honolulu towards Waikīkī, 'Ī'ī stated, "From the makai side of Kaoaopa was a trail to the sea at Kakaako, where stood the homes of the fishermen. Below the trail lived Hehehewa and his fellow kahunas" ('Ī'ī 1959:91).

### 3.1.2 Early Post-Contact History and Population Centers

The *ili* of Ka'ākaukui is between two traditional population centers, Kou (Honolulu) and Waikīkī, on the southern shore of O'ahu. In Waikīkī, a system of irrigated taro *lo'i* (irrigated fields) fed by streams descending from Makiki, Mānoa and Pālolo valleys blanketed the plain, and networks of fishponds dotted the shoreline. Similarly, Kou—the area of downtown Honolulu surrounding the harbor—possessed shoreward fishponds and irrigated fields watered by ample streams descending from Nu'uānu and Pauoa valleys. The pre-Contact population and land use patterns of Ka'ākaukui may have derived from its relationship to these two densely populated areas; it may have participated in some of the activities associated with them. Thus, the attempt to reconstruct the region—as it existed for Hawaiians during the centuries before Western Contact and the modern urbanization that has reconfigured the landscape—must begin with accounts of Kou and Waikīkī.

Waikīkī is actually the name of a large *ahupua'a* (traditional land division) encompassing lands stretching from Honolulu to Maunalua Bay. Within that *ahupua'a*, by the time of the arrival of Europeans during the late eighteenth century, the area today known as Waikīkī had long been a center of population and political power on O'ahu. According to Martha Beckwith (1940:383), by the end of the fourteenth century, Waikīkī had become “the ruling seat of the chiefs of O'ahu.” The pre-eminence of Waikīkī continued into the eighteenth century and is confirmed by the decision of Kamehameha, in the midst of unifying control of the islands, to reside there after winning control of O'ahu by defeating the island's chief, Kalanikūpule.

Chiefly residences were only one element of a complex of features sustaining a large population that characterized Waikīkī up through the pre-Contact period. Beginning in the fifteenth century, a vast system of irrigated taro fields was constructed, extending across the littoral plain from Waikīkī to lower Mānoa and Pālolo valleys. This field system, an impressive feat of engineering design traditionally attributed to the chief Kalamakua, took advantage of streams descending from Makiki, Mānoa, and Pālolo valleys, which also provided ample fresh water for the Hawaiians living in the *ahupua'a*. Water was also available from springs in nearby Mō'ili'ili and Punahou. Closer to the Waikīkī shoreline, coconut groves and fishponds dotted the landscape. A continuous zone of population and cultivation, from the shoreline of present day Waikīkī Beach, extended north well into Mānoa Valley. The western and eastern bounds of this zone are less clear, and there are no specific references to Waikīkī's abundance reaching into the Kewalo region (Handy and Handy 1972).

A basic description of Honolulu and Kou, up to western contact, is given by E. S. Craighill and Elizabeth Handy:

What is now Honolulu was originally that flatland area between the lower ends of Nu'uānu and Pauoa Valleys and the harbor. [W.D.] Westervelt . . . wrote that 'Honolulu was probably a name given to a very rich district of farm land near what is now . . . the junction of Liliha and School Streets, because its chief was Honolulu, one of the high chiefs at the time of Kakuhihewa'. . . . It is probable that the chief referred to by Westervelt took his name from the harbor and adjoining land. The original name of the land where the town grew when the harbor became a haven for foreign ships was Kou. . . . The number of *heiau* in this area indicates that it was

a place of first importance before the era of foreign contact. [Handy and Handy 1972:479]

Rev. Hiram Bingham, arriving in 1820, described Honolulu as still a Native “village” on the brink of Western-induced transformations:

We can anchor in the roadstead abreast of Honolulu village, on the south side of the island, about 17 miles from the eastern extremity. . . . Passing through the irregular village of some thousands of inhabitants, whose grass thatched habitations were mostly small and mean, while some were more spacious, we walked about a mile northwardly to the opening of the valley of Pauoa, then turning southeasterly, ascending to the top of Punchbowl Hill, an extinguished crater, whose base bounds the northeast part of the village or town. . . . Below us, on the south and west, spread the plain of Honolulu, having its fishponds and salt making pools along the seashore, the village and fort between us and the harbor, and the valley stretching a few miles north into the interior, which presented its scattered habitations and numerous beds of kalo (*arum esculentum*) in its various stages of growth, with its large green leaves, beautifully embossed on the silvery water, in which it flourishes. [Bingham 1847:92-93]

The Ka‘ākaukukui region would have been in Bingham’s view as he stood atop “Punchbowl Hill” looking toward Waikīkī to the south; it would have comprised part of the area he describes as the “plain of Honolulu” with its “fishponds and salt making pools along the seashore.”

Another visitor to Honolulu in the 1820s, Captain Jacobus Boelen, hints at the possible pre-Contact character of Honolulu and its environs, including the Kewalo area:

It would be difficult to say much about Honoruru. On its southern side is the harbor or the basin of that name (which as a result of variations in pronunciation [*sic*] is also written as Honolulu, and on some maps, Honoonoono). The landlocked side in the northwest consists mostly of taro fields. More to the north there are some sugar plantations and a sugar mill, worked by a team of mules. From the north toward the east, where the beach forms the bight of Whytete, the soil around the village is less fertile, or at least not greatly cultivated. [Boelen 1988:62]

Boelen’s description implies the Ka‘ākaukukui region and the present project area are within a “not greatly cultivated” region of Honolulu perhaps extending from Pūowaina (Punchbowl Crater) at the north through Kaka‘ako to the Kālia portion of Waikīkī in the east.

An early, somewhat generalized depiction of the pre-Contact Native Hawaiian shaping of Waikīkī, Honolulu, and the Ka‘ākaukukui region is given on an 1817 map (Figure 8) by Otto von Kotzebue, commander of the Russian ship *Rurick*, who visited O‘ahu the previous year. The map shows taro *lo‘i* (illustrated by the rectangles representing irrigated fields) massed around the streams descending from Nu‘uanu and Mānoa valleys. The depicted areas of population and habitation concentration (illustrated by the trapezoids) probably reflect an early post-Contact shift of Hawaiians to the area around Honolulu harbor—the only sheltered landing on O‘ahu and the center of increasing trade with visiting foreign vessels. Kamehameha himself had moved from Waikīkī to Honolulu in 1809.

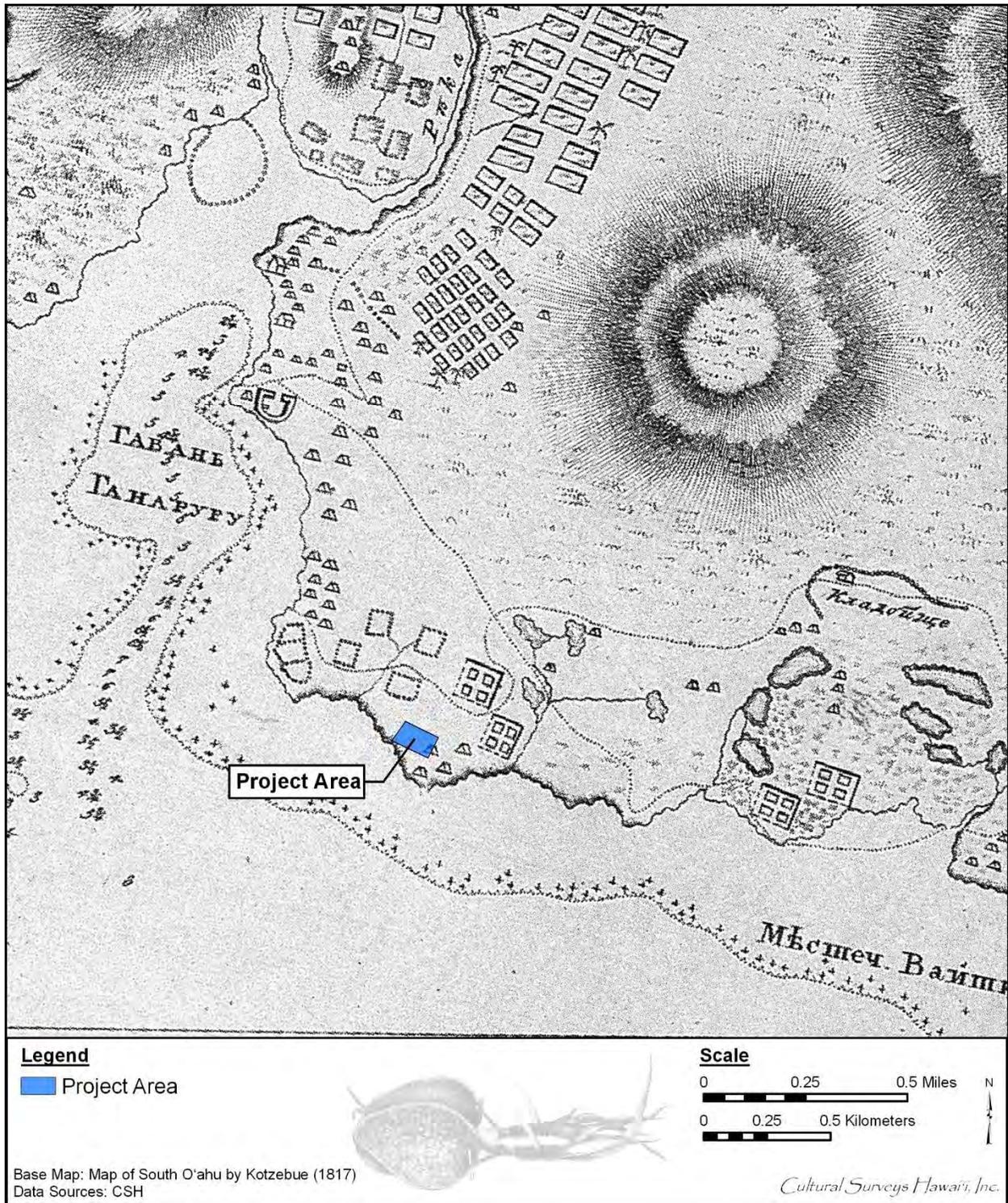


Figure 8. 1817 map of South O’ahu by Otto von Kotzebue, showing taro *lo’i*, fishponds, and salt pans in Honolulu and Waikīkī; note the presence of traditional Hawaiian habitation within and in the vicinity of the project area (map reprinted in Fitzpatrick 1986:48-49)

Kotzebue's map illustrates that the land between Pūowaina (Punchbowl Crater) and the shoreline—which would include the Ka'ākaukukui area—formed a “break” between the heavily populated and cultivated centers of Honolulu and Waikīkī; the area is only characterized by fishponds, salt ponds, trails connecting Honolulu and Waikīkī, and occasional taro *lo'i* and habitation sites. However, habitation sites are depicted within and in the vicinity of the project area (see Figure 8). An 1855 map of Honolulu by Joseph de la Passe, a lieutenant aboard the French vessel *L'Eurydice*, also illustrates sparse coastal habitation within the project area (Figure 9).

A clearer picture of Ka'ākaukukui and the project area develops with accounts dating to the first half of the nineteenth century by other Honolulu visitors and/or settlers. Gorman D. Gilman, who arrived in Honolulu in 1841, recalled in a memoir the limits of Honolulu during the early 1840s:

The boundaries of the old town may be said to have been, on the *makai* [seaward] side, the waters of the harbor; on the *mauka* [inland] side, Beretania street; on the Waikīkī side [i.e., the area just beyond Punchbowl Street], the barren and dusty plain, and on the Ewa [west] side, the Nuuanu Stream. [Gilman 1904:97]

Gilman further described the “barren and dusty plain” beyond (east of) Punchbowl Street:

The next and last street running parallel [he had been describing the streets running *mauka-makai*, or from the mountains to the shore] was that known as Punchbowl Street. There was on the entire length of this street, from the *makai* side to the slopes of Punchbowl, but one residence, the two-story house of Mr. Henry Diamond, *mauka* of King Street. Beyond the street was the old Kawaihāo church and burying ground. A more forsaken, desolate looking place than the latter can scarcely be imagined. One, to see it in its present attractiveness of fences, trees and shrubbery, can hardly believe its former desolation, when without enclosure, horses and cattle had free access to the whole place. [Gilman 1904:89]

That the environs of the missionary enclave and Kawaihāo Church were indeed “forsaken” and “desolate looking” in the 1820s when the missionaries first settled there is confirmed in the memoirs of the American missionary C.S. Stewart who, arriving on Maui after living at the mission, declared Lahaina to be “like the delights of an Eden” after “four weeks residence on the dreary plain of Honoruru” (Stewart 1970:177). It is likely these descriptions of the Honolulu plain also include the area now known as Kaka'ako. The barrenness of the Kaka'ako area is illustrated in two sketches, one made in 1834 (Figure 10) when Kawaihāo church was still a long grass-thatched building and one made in 1850 (Figure 11) after the grass hut had been replaced by a large coral stone structure with a steeple. Between Kawaihāo Church and the sea are only a few scattered huts along the shore and aligned along the inland trail (now covered by King Street). An 1887 photograph (Figure 12 and Figure 13) of the area also shows the marshy nature of the area, with only scattered houses near the ponds or near the shore *makai* of Kawaihāo Church.

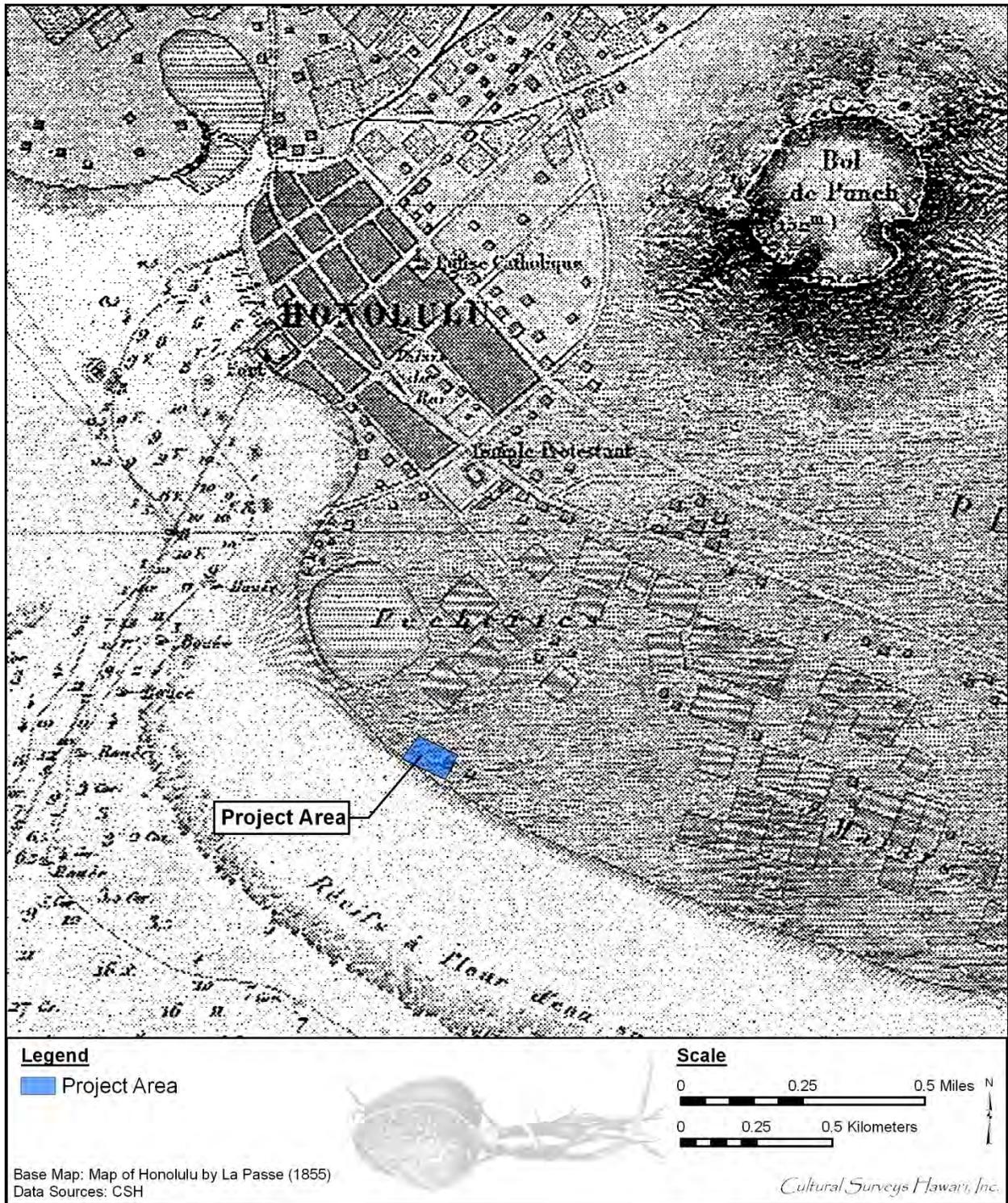


Figure 9. 1855 map of Honolulu by Lt. Joseph de La Passe of the French vessel *L'Eurydice*; note the project area is indicated within an area of coastal habitation (reprinted in Fitzpatrick 1986:82-83)

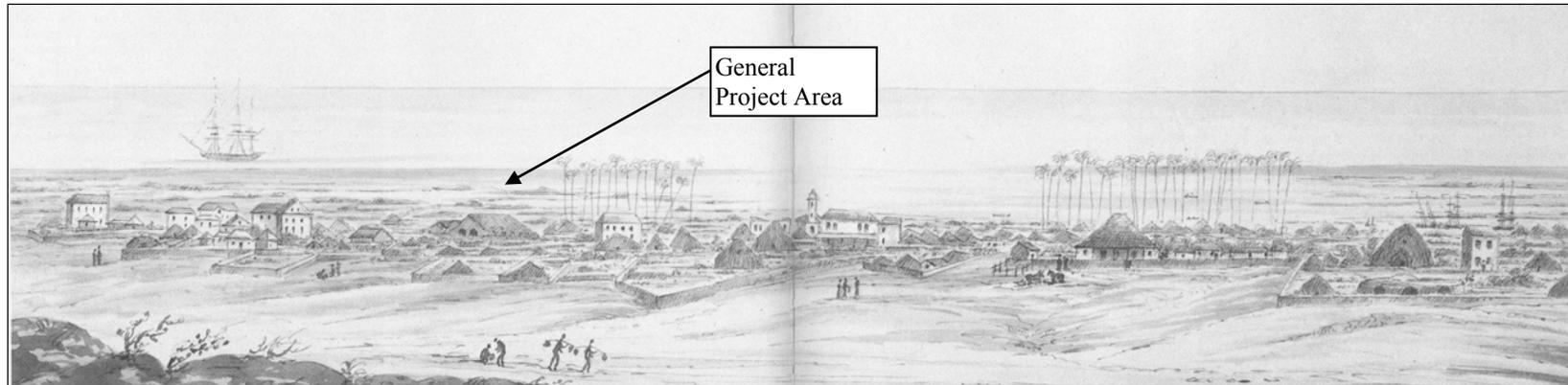


Figure 10. Portion of 1834 sketch by anonymous illustrator entitled “Town of Honolulu: Island of Woahoo: Sandwich Islands” (original sketch at Bishop Museum; reprinted in Grant 2000:64-65); project area would be *makai* of Kawaiaha‘o Church, at this time a long grass-thatched structure

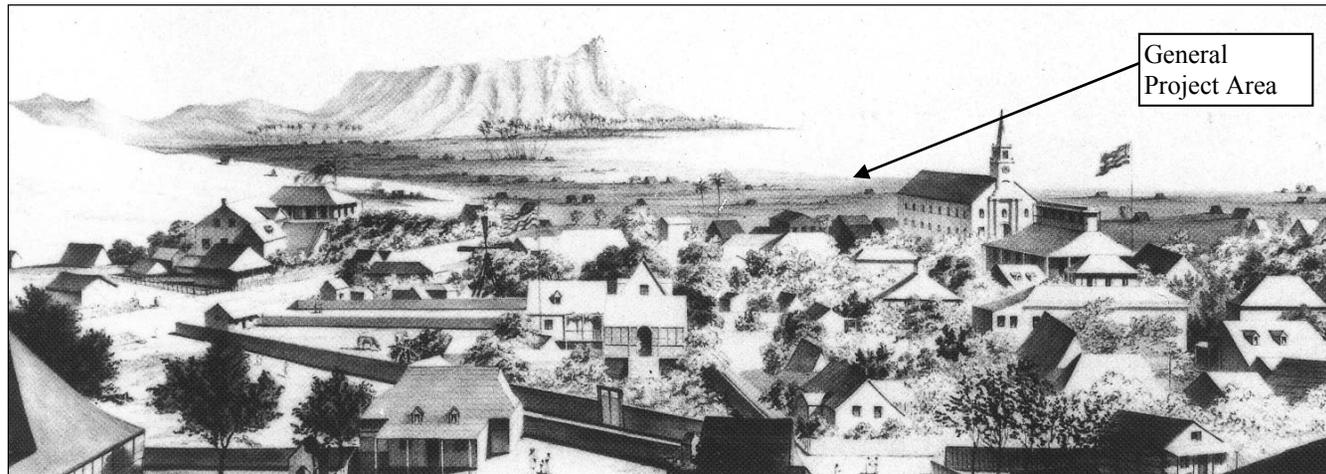


Figure 11. 1850 sketch by Paul Emmert (original sketch at Hawaiian Historical Society; reprinted in Grant 2000:5); the project area would be *makai* of the Kawaiaha‘o Church, by this time a stone structure with a steeple

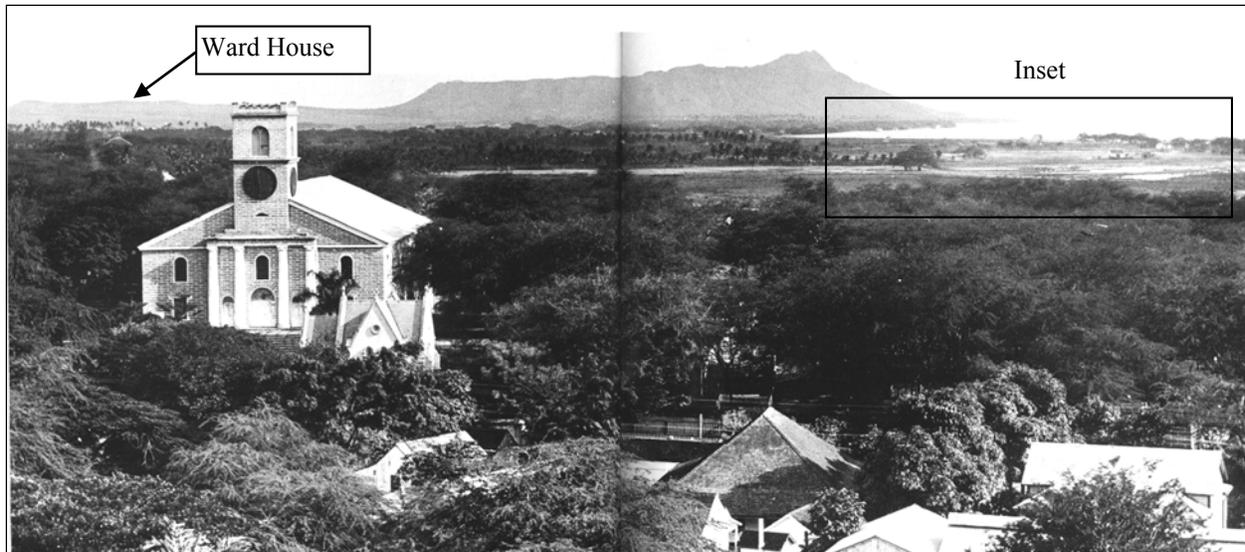


Figure 12. 1887 (ca.) photograph of Honolulu and Waikīkī; Kawaiahaʻo Church in left foreground; the cupola on the roof of the Ward's House on the *mauka* end of Old Plantation can be seen in the upper left of the photograph; the project area is within the marshlands seen in the right upper background (original photograph at Hawai'i State Archives, Henry L. Chase Collection; reproduced in Stone 1983:84-85)



Figure 13. Enlarged inset section on 1887 (ca.) photograph (Figure 12 above) showing marshlands and scattered huts along the coast near the project area

### 3.1.3 Mid-Nineteenth Century to Twentieth Century

#### 3.1.3.1 The Māhele and Land Commission Awards

Among the first descriptions of Ka'ākaukukui by Hawaiians are the testimonies recorded during the 1840s in documents associated with Land Commission Awards (LCA) and awardees of the Māhele—the division of Hawaiian lands—which introduced private property into Hawaiian society. The LCA records indicate the traditional Hawaiian usage of the region and its environs may have been confined to salt making and farming of fishponds, with some wetland agriculture in those areas *mauka* or toward Waikīkī at the very limits of the field system descending from Makiki and Mānoa valleys. However, the testimonies do indicate the area was occupied and shaped by Hawaiians before the nineteenth century. The LCA records also reveal that midway through the nineteenth century taro cultivation, traditional salt making, and fishpond farming activities continued within the Ka'ākaukukui area. These activities and the land features that supported them would subsequently be eliminated/or buried by urbanization during the remainder of the nineteenth century. The LCA records and historic maps and archival photographs document more precisely traditional Hawaiian settlement and subsequent historic land usage within and around the present project area.

The *'ili* of **Ka'ākaukukui** (LCA 7713) was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. Ka'ākaukukui consisted of three non-contiguous sections, a type of *'āina* (land) called a *lele*. An early surveyor for the Hawaiian Government Survey office explains about *lele* in general, and Ka'ākaukukui in particular:

There were two features of the *ili*, referred to by the terms *lele* . . . the *ili* often consisted of several distinct sections of land—one, for instance, on the seashore, another on dry, open land, or *kula*, another in the regularly terraced and watered *kalo* patch or *aina loi* district, and another still in the forest, thus again carrying out the equitable division system which we have seen in the *ahupuaa*.

These separate pieces were called, *lele*, i.e., 'jumps,' and were most common on Oahu. . . . Kaakaukukui held Fisherman's Point and the present harbor of Honolulu; then *kalo* land near the present Kukui street, and also a large tract of forest at the head of Pouoa [Pauoa] Valley. . . .

These different pieces were called variously, either by their own individual name or by that of the whole *ili*, thus puzzling one sadly when attempting to obtain information with respect to them. [Lyons 1894:1697]

There were no smaller *kuleana* awards to commoners within this award. The award also included the southern portion of the *'ili* of Pu'unui and a large fishpond (labeled Loko Ka'ākaukukui) surrounded by land in the *'ili* of 'Auwaiolimu. Loko Ka'ākaukukui was probably a fishpond fed by spring water, but the other ponds in her award, Loko Kaimukana, Loko Kalokoeli, and possibly Loko Kuimeki, were probably salt ponds filled by tidal waters. This land does not seem to have been used in this period for habitation.

There are three LCAs shown on maps on the northwestern border of Ka'ākaukukui. In the Māhele testimony, these awards are listed as within the *'ili* of **Kaka'ako**.

LCA 4457 to Ana Kaloa was inhabited by her family since the days of Kamehameha I; it had four fishponds, an *'auwai* and a house enclosed by a fence.

LCA 3455 to Kaule for Liliha, a house lot (*pahale*) bound by the sea and the mouth of a stream (*muliwai*), was inherited from Kamehameha I.

LCA 247, a house lot, was claimed by Charles Kana'ina for W.C. Lunalilo, who received his land before the Māhele from his mother (*mamua loa*). Kana'ina was a friend to Kamehameha II and married his fifth wife Kekauluohi. Their son was Lunalilo, who became the sixth monarch of Hawai'i.

An 1876 map of the *'ili* of Ka'ākaukukui and Pu'unui (Figure 14) shows the project area just *mauka* of the coastline with an area of salt pans to the northwest; there are no *kuleana* lots to commoners and no habitations. All habitation lots near Ka'ākaukukui are located in clusters near Queen Street, most in the settlement at Honuakaha, or further inland along King Street, as shown on a 1884 map (Figure 15) and a 1887 map (Figure 16).

### 3.1.3.2 Kaka'ako Salt Works and the Salt Pans of Kewalo and Kukuluāe'o

As noted in the Land Commission Award testimony, much of the land in Ka'ākaukukui and Kukuluāe'o was used to produce salt. The Hawaiians used *pa'akai* (salt) for a variety of purposes, to flavor food, to preserve fish by salting, for medicines, and for ceremonial purposes. David Malo described the traditional method of making salt:

*O ka paakai kekahi mea e pono ai, he mea e ono ai, ka ia, a me ke koekoe o ka paina ana, he mea hana ia ka paakai, ma kekahi aina, aole i hana a ma kekahi aina, o ke kai makai, e kii aku no ka wahine, a lawe mai ma ke poi, a ke kai hooholo ia mai kekahi ma kauwahi mai.*

*E waiho kela kai ma kekahi poho paha, he ekaha paha, he kahe ka paha, a liu malaila, alaila lawe ana kauwahi e, a paakai iho la no ia, o ka papa laau ka mea kui poi. [Malo 2006:73]*

#### Translation

Pa'akai (salt) is another beneficial item. It is used to make fish delicious and tasteless foods edible. Pa'akai is made at a particular place, [but] it [salt] is not actually made from this spot, rather it [salt water] came from the sea. A woman went to get some when the sea crashed [upon the rocks] and she ran back [the salt water] to this particular spot.

That salt water (kai) is placed in, perhaps, a depression (poho) or a 'Bird's nest' (ēkeha) or rock basin (kāheka) and allowed to evaporate (liu). Then it is taken to another spot and is formed into pa'akai. Wooden boards (papa lā'au) are used to pound poi (*mashed cooked kalo corms*) on. [Malo 2006:95]

In 1903, Nathaniel Emerson translated David Malo's articles on early Hawaiian life. In his publication, the translations are not literal, but include information that Emerson added to clarify the accounts. In Emerson's translation,

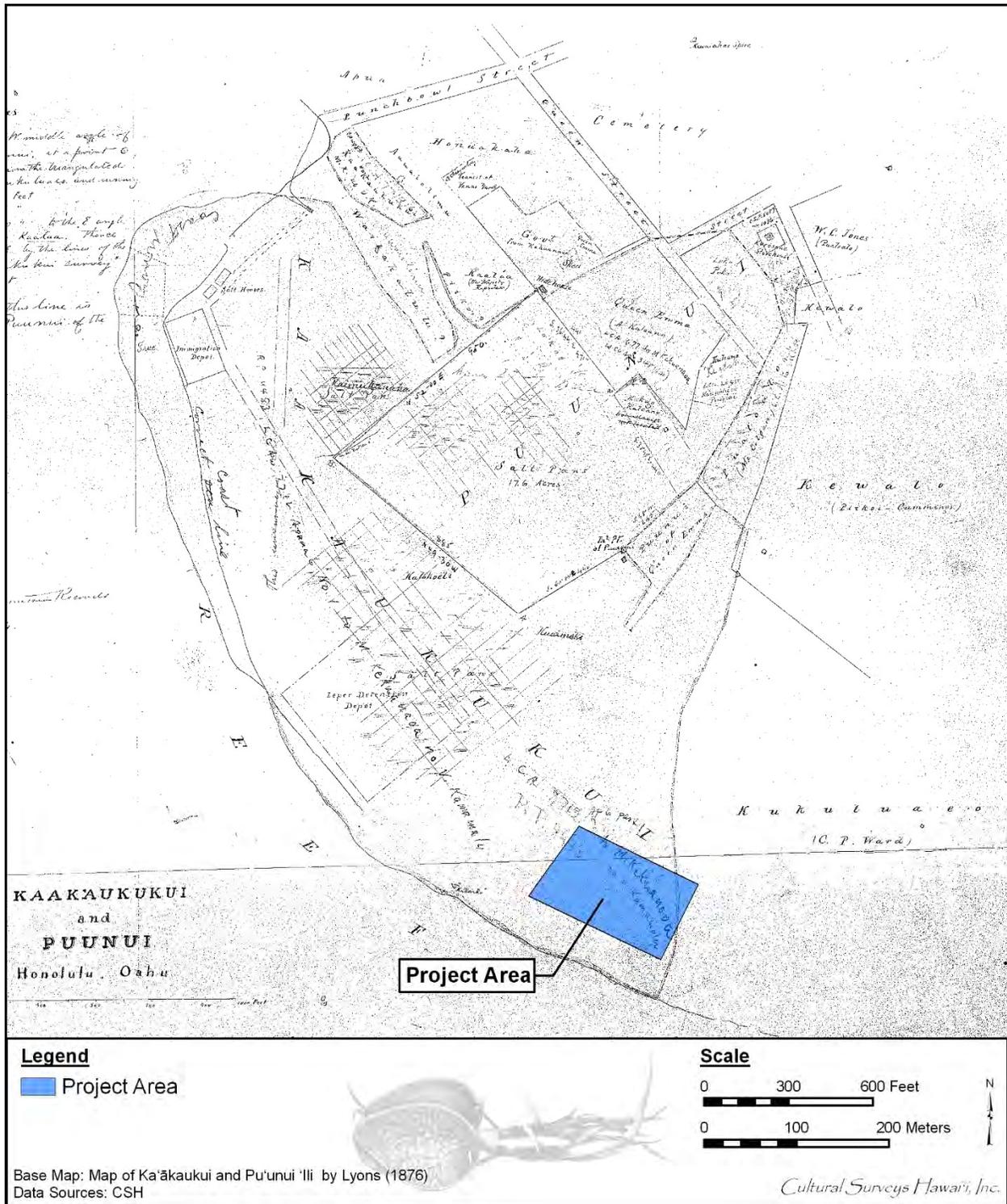


Figure 14. 1876 map of Ka'akaukui and Pu'unui 'Ili by C.J. Lyons

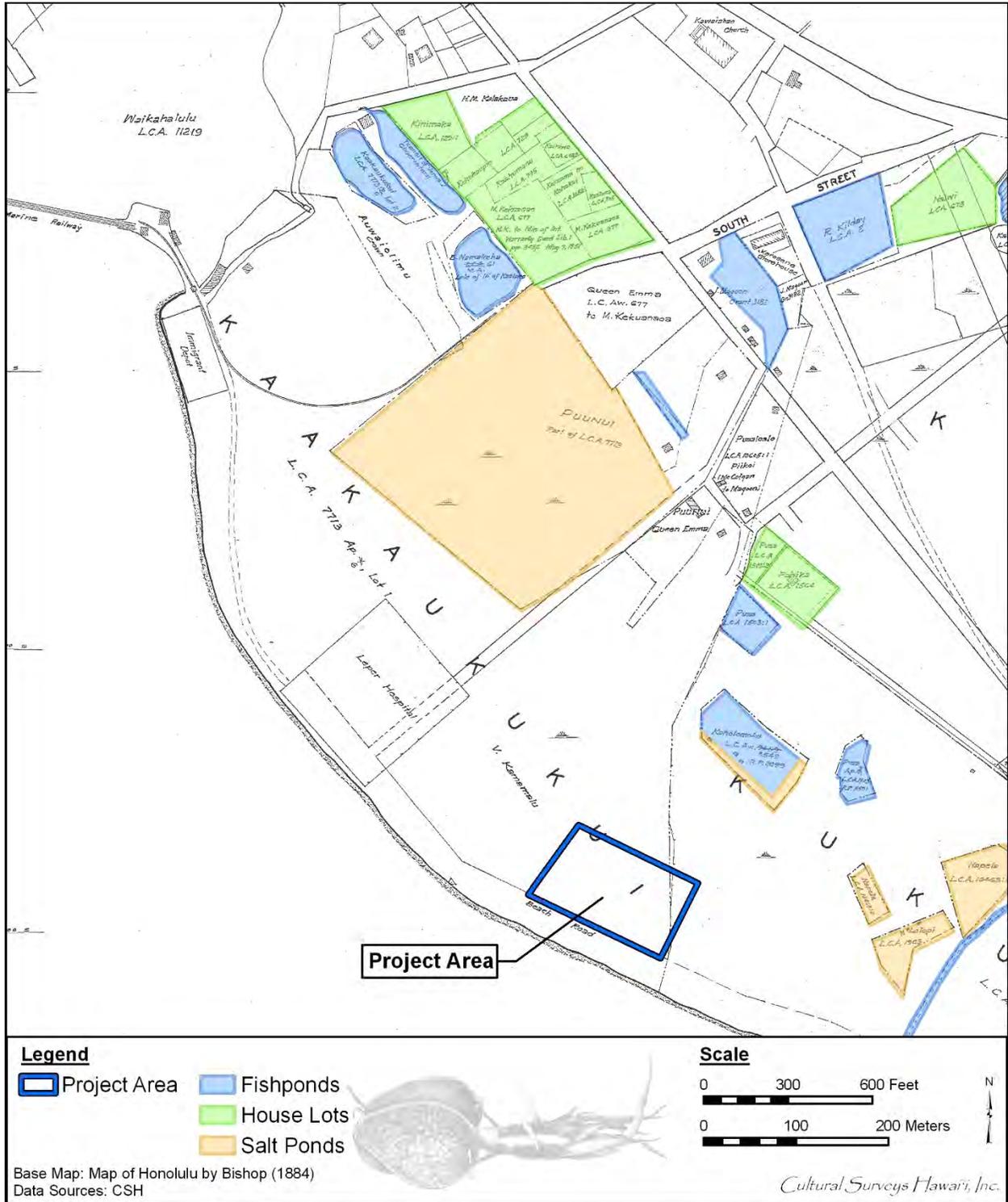


Figure 15. 1884 map of Honolulu, Kewalo Section (portion) by Sereno Bishop showing the locations of LCA parcels, fishponds, salt lands, and house lots; note the absence of houses within the project area

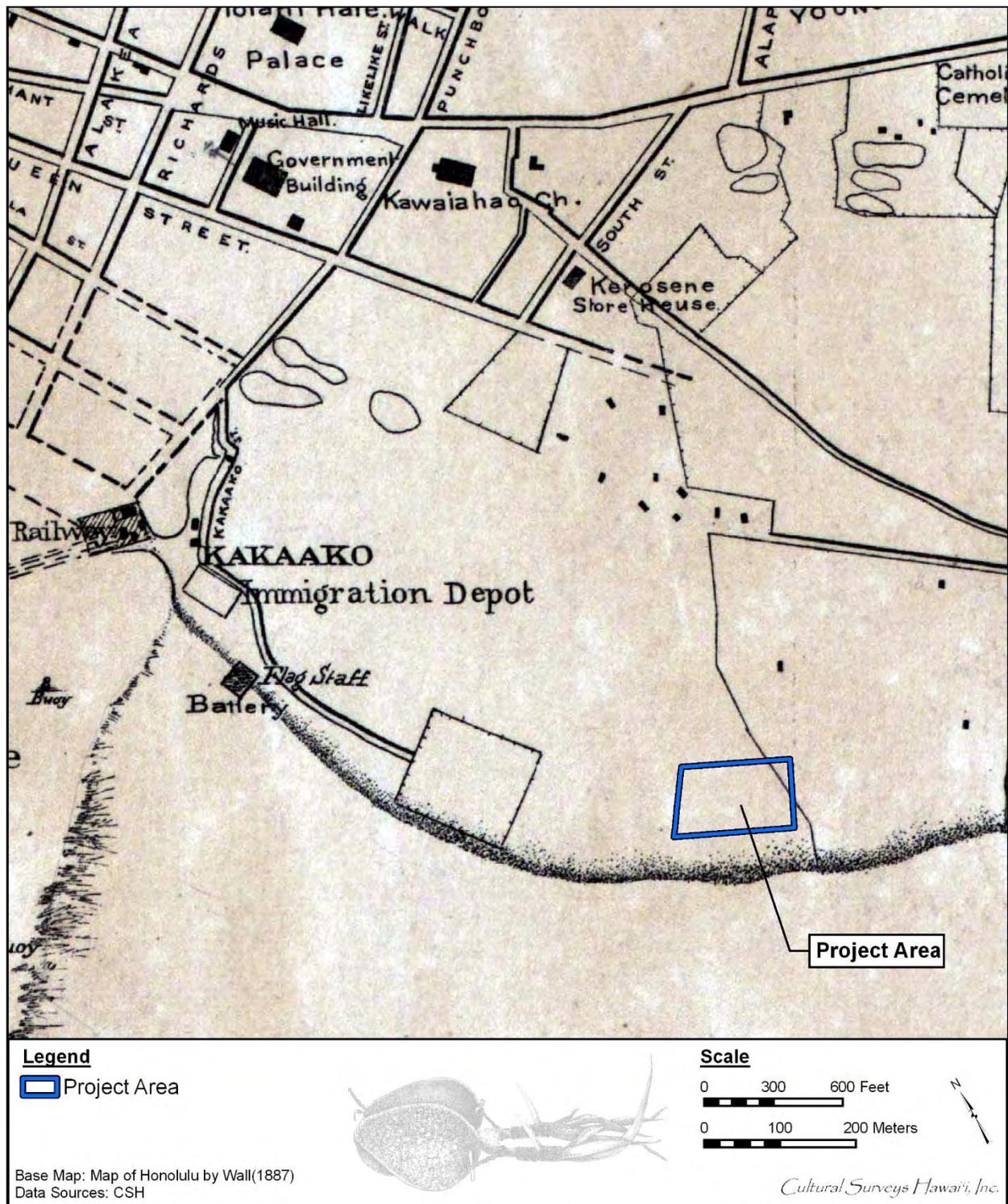


Figure 16. 1887 map of Honolulu (portion) by W.A. Wall (copy at Library of Congress, Geography and Map Division), showing project area location

Salt was one of the necessities and was a condiment used with fish and meat, also as a relish with fresh food. Salt was manufactured in certain places. The women brought sea-water in calabashes, or conducted it in ditches to natural holes, hollows and shallow ponds (*kekaha*) on the sea-coast, where it soon became strong brine from evaporation. Thence it was transferred to another hollow or shallow vat, where crystallization into salt was completed. [Malo 1951:123]

Captain Cook was the first to note the method of making salt in prepared “salt pans.”

Amongst their arts, we must not forget that of making salt, with which we were amply supplied, during our stay at these islands, and which was perfectly good of its kind. Their salt pans are made of earth, lined with clay; being generally six or eight feet square, and about eight inches deep. They are raised upon a bank of stones near the high-water mark, from whence the salt water is conducted to the foot of them, in small trenches, out of which they are filled, and the sun quickly performs the necessary process of evaporation. . . . Besides the quantity we used in salting pork, we filled all our empty casks, amounting to sixteen puncheons, in the Resolution only. [Cook 1784:151]

In the years following the discovery of the Islands by Captain Cook in 1778, British and American fur traders who stopped at Hawai'i on their way to China often stocked up on food and water and salt which was used to cure the seal and mammal pelts collected from the Northwest Coast. During Kotzebue's visit in 1816 and 1817, he noted that “Salt and sandalwood were the chief items of export” (in Thrum 1904:50).

The journals of none mention the object of call other than for refreshments, though one, 3 some years later, records the scarcity and high price of salt at the several points touched at, with which to serve them in the curing of furs obtained on the coast. In all probability salt was the first article of export trade of the islands and an object, if not the object, of these pioneer fur-traders' call. [Thrum 1904:45]

The missionary William Ellis, on a tour of the Hawaiian Islands in 1822 and 1823, also noted salt pans and recorded the final step of crystallization.

The natives of this district (Kawaihae) manufacture large quantities of salt, by evaporating the sea water. We saw a number of their pans, in the disposition of which they display great ingenuity. They have generally one large pond near the sea, into which the water flows by a channel cut through the rocks, or is carried thither by the natives in large calabashes. After remaining there for some time, it is conducted into a number of smaller pans about six or eight inches in depth, which are made with great care, and frequently lined with large evergreen leaves, in order to prevent absorption. Along the narrow banks or partitions between the different pans, we saw a number of large evergreen leaves placed. They were tied up at each end, so as to resemble a narrow dish, and filled with sea water, in which the crystals of salt were abundant. [Ellis 1827:403-404]

In an article on Hawaiian salt works, Thomas Thrum (1924) discussed the large salt works at Ālia Pa'akai (Salt Lake in Moanalua) and at Pu'uloa on the western loch of Pearl Harbor. Kamakau (1961:409) reported “The king and Isaac of Pu'uloa are getting rich by running the salt water into

patches and trading salt with other islands.” The salt was sent to Russian settlements in the Pacific Northwest, where it was used to pack salmon (*Hawaiian Gazette*, 29 January 1897). Thrum also mentioned a salt works in Kaka‘ako.

Honolulu had another salt-making section in early days, known as the Kakaako salt works, the property of Kamehameha IV, but leased to and conducted by E.O. Hall, and subsequently E.O. Hall & Son, until comparatively recent years. This enterprise was carried on very much after the ancient method of earth salt pans as described by Cook and Ellis. [Thrum 1924:116]

In the testimony for LCA 1903, Lolopi claimed two *ālia* (salt beds), 15 *ho‘oliu* (drains), two *poho kai* (depressions where salt is gathered) and one salt *kula* (dryland or non-cultivated land). Four separate types of salt features are mentioned, 1) the ponds near the shore that fill with salt water at high tide (*ālia*), 2) the drains (*ho‘oliu*) where the salt water is transferred to smaller clay-lined or leaf-lined channels, 3) the natural depressions (or modified depressions) in the rocks along the shore where salt formed naturally, and 4) the salt *kula*, which was waste land, not suitable for agriculture as it was impregnated with salt. Lolopi did not live near his salt lands, but Pahiha, claimant of LCA 1504, did have a house near his fishpond and salt bed. The house was probably a simple grass hut, similar to those shown on an 1838 sketch entitled “Honolulu Salt Pans, Near Kakaako” and the one shown on an 1845 sketch of the “Old Salt Pans” (Figure 17 and Figure 18).

The export of salt declined in the late nineteenth century. Thrum (1924:116) stated that the apex of the trade was in 1870, but by 1883, he noted that “pulu, salt and oil have disappeared entirely” from the list of yearly exports (Thrum 1884:68). By 1916, only one salt works, the Honolulu Salt Company, was still in operation. Salt continued to be manufactured for local use. The Kaka‘ako Salt Works appears on maps as late as 1891 and a page in Victoria Ward’s ledger for 1883 notes a yearly income of \$651.50 received from her “Salt Lands” in Kukuluāe‘o (Hustace 2000:50).

In a 1906 article, Rev. Westervelt (1906:43-46) explained the Chinese method of salt evaporation at the Honolulu salt beds. The Chinese worker first used a water pump to draw the seawater from the larger ditch below to the salt-evaporation beds above. The man moved the two handles back and forth to work the pump. The evaporation beds were lined with clay, wet with sea water, and tramped and pounded down. Each pan was about 20 ft sq, covered with about two inches of water, and bound by an earth dyke, so that the area looked like a large grid, as shown in a modern photograph of the salt beds at Hanapēpē, Kauai (Figure 19) and a photograph of the Kewalo salt brine beds (Figure 20). After allowing the sun to evaporate some of the water, the worker stepped into the evaporation pan and scraped the salt into a pile in the center with a simple wooden scraper. He then threw a large basket shaped like a scoop into the brine and used a tin dipper to move the salt to the basket. Two baskets, one on each side of a pole, were then carried on the back of a worker across the thin earth dykes between the salt pans. The baskets were dumped into large drying piles, where the remaining water seeped out into the ground. The salt was then sewn into gunny sacks and sent to the market for sale.

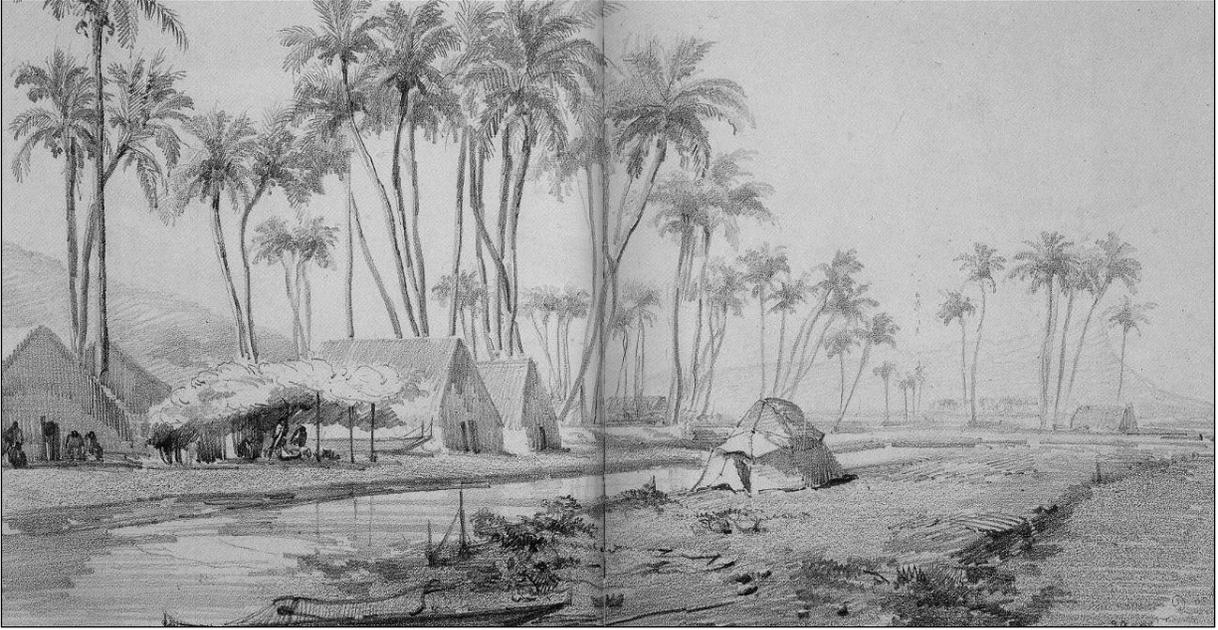


Figure 17. 1838 sketch of “Honolulu Salt Pan, near Kaka‘ako” drawn by a French visitor, Auguste Borget (original sketch at Peabody Essex Museum, Salem, Massachusetts; reprinted in Grant 2000:64-65)

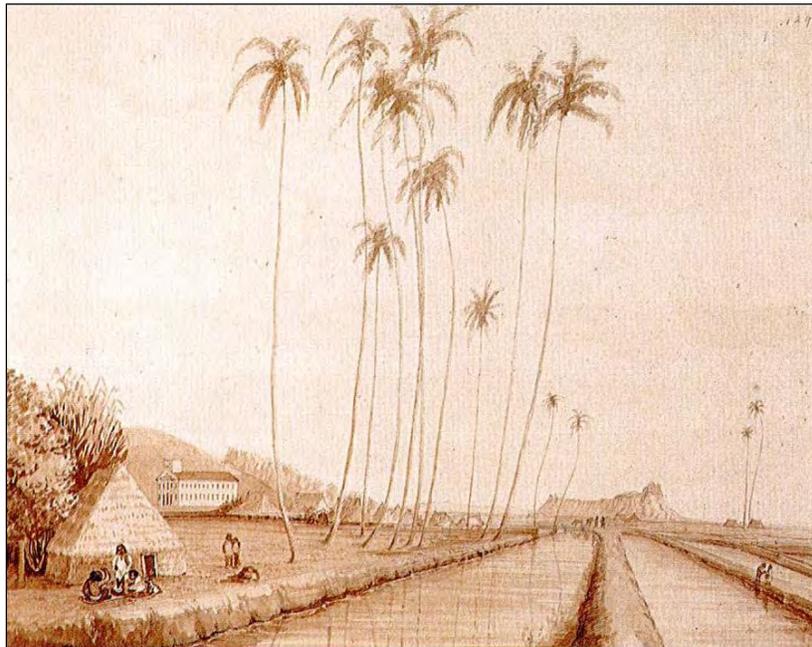


Figure 18. 1845 sketch of “Native Church [Kawaiaha‘o Church], Oahu, from the Old Salt Pans,” drawn by John B. Dale, from the U.S. Exploring Expedition led by Lt. Charles Wilkes (J. Welles Henderson Collection, reprinted in Forbes 1992:126); the sketch is probably from the salt pans in the Ka‘ākaukui area



Figure 19. Traditional-type salt evaporation pans in Hanapēpē, Kaua'i (photograph from Hawai'i State Historic Preservation Division)



Figure 20. 1902 photograph of Kewalo brine basins, showing rectangular, grid-like pans (original photograph at Bishop Museum; reprinted in Scott 1968:579)

By 1901, most of the fishponds and salt pans *makai* of the Ward “Old Plantation” area were reported as abandoned. In that year, the Hawaii Legislature (1901:185) proposed to build a ditch to drain away the “foul and filthy water that overflows that district at the present time.”

The district *makai* of King St. and the Catholic Cemetery, Ewa of Mrs. Ward’s (the Old Plantation), mauka of Clayton St., and Waikiki of the land from King St., leading to the Hoomananaauao Church, consists of six large abandoned fish ponds and a large number of smaller ones, all in filthy condition, fed by springs and flowing into Peck’s ditches. Just *makai* of these ponds, at the end of Clayton street, next to Mr. Ward’s, is Peck’s place. An artesian well flushing the wash houses flows into two foul ditches, thence to the big pond which is Waikiki of what used to be Cyclomere and next to Mrs. Ward’s line [ditch] extending down to Waimanu St.

The rear portion of Mrs. Ward’s property down to Waimanu St. used to be fish ponds all connecting to the sea by a ditch which is fed by an artesian well. These ponds, with the exception of three, are abandoned. [Hawaii Legislature 1901:185]

### 3.1.3.3 Kaka‘ako’s Role as a Human Quarantine Center and Cemetery Area

During the 1853 smallpox epidemic, patients were isolated at a temporary quarantine camp, a hospital was set up at Kaka‘ako (Thrum 1897), and victims of the disease were buried at the Honuakaha Cemetery near the modern junction of Quinn Lane and South Street (Griffin et al. 1987:13; Hammatt and Pfeffer 1993; Pfeffer et al. 1993).

Hansen’s Disease (leprosy) was first reported in 1840, and first definitely identified in 1853. During the next 25 years (1853-1878), there were 160 cases per year (about 4,000) and 80 cases (about 4,000) per year in the following 50 years (1878-1928), steadily decreasing to 60 cases a year in 1931 and 20 cases a year by 1951 (Arnold 1956:317). In 1865, a receiving hospital in Kalihi, west of Honolulu town, was set up to examine suspected lepers. If the diagnosis was confirmed, the patients were forcibly exiled to the Kalaupapa colony on Moloka‘i. In cases where it was uncertain if the patient had leprosy or some other type of skin disease, the stay at the hospital could extend into weeks while the doctors waited for definite symptoms of leprosy to develop.

In 1881, a branch hospital and receiving station for cases of Hansen’s Disease was opened in Kaka‘ako, in a block now bounded by Ala Moana, Auahi, Coral and Keawe streets, located to the southeast of the current project area (Griffin et al. 1987:55 [see Figure 15]), with 48 patients tended by Dr. George L. Fitch (Hanley and Bushnell 1980:112). This land, at “Fisherman’s Point,” was donated by Princess Ruth Ke‘elikōlani. On an 1881 map of O‘ahu (Figure 21) the project area is indicated to be just *makai* of the Kaka‘ako Salt Works.

One of the main purposes of the Kaka‘ako Detention Center was to keep suspected lepers isolated from the general public. Sister Leopoldina, a Franciscan sister, likened the Kaka‘ako Hospital in 1885 to a prison, enclosed by

. . . a high close board fence and large strong locked gates. . . A large building [sat] over those gates where the lepers were allowed to talk with their relatives



Figure 21. 1881 Hawaiian Government Survey map of O'ahu, Hawaiian Islands, by R. Covington, showing project parcel in Ka'ākaukui 'Ili in salt pan (grid) area

through prison bars. No one was allowed to enter without a permit from the Board of Health. [Hanley and Bushnell 1980:114]

As the complex was on a former salt marsh near the sea, it was subject to flooding at high tide. The salt water killed all vegetation and made it impossible to landscape the complex with grass or plants; the water swept away stone-bordered paths, corroded metal, and destroyed the whitewash on the buildings. Even so, the Board of Health expected the patients to help feed themselves by growing their own vegetables in gardens on the center's grounds. Overcrowding was also a problem. The hospital, built to house 100 patients, had over 200 residents by 1883. Dr. Fitch was in favor of making the Kaka'ako station a permanent leprosarium, and often delayed sending confirmed lepers to Moloka'i (Hanley and Bushnell 1980).

In 1883, Walter Murray Gibson, minister in King Kalākaua's government and head of the Board of Health, sent out a plea for a religious order to care for the sick of Hawai'i, especially the lepers. The call was answered by the Franciscan Sisters of Syracuse, New York, led by Mother Marianne Cope. Seven sisters arrived in Honolulu and made their first visit to the Kaka'ako Leper Detention Center in November of 1883. They were appalled by what they saw—tumble-down cottages, filth and flies in the dining area, and the stench of the leper's unwashed sores. The hospital steward, J.J. Van Geisen, took them on a tour.

'Now let me show you the most interesting place,' he announced, leading the group to a narrow building that teetered on pilings over the surf. The structure had been divided into three dingy cubicles, with warped floors and windows ghosted by salt spray. The first of the rooms was the 'morgue.' Van Geisen explaining that when a patient's condition reached a certain point, he was forced into the morgue and remained there until dead. The body was then dragged to the second cubicle, where Fitch performed an autopsy. Finally the remains were moved to the third room, to await a burial team. [Tayman 2006:143]

The sisters built a convent at the hospital in November to live near their patients. The convent was a two-story house with a hall, parlor, and refectory on the ground floor, and five bedrooms upstairs. A small chapel attached to the rear of the structure was dedicated to St. Philomena. The sisters soon took the running of the hospital in hand, cleaning and whitewashing the cottages, separating the males and females into two wards, and setting up new landscaped areas and gardens (Figure 22) (Hanley and Bushnell 1980).

In 1884, Mother Marianne built a home at Kaka'ako for the non-leprous daughters of the patients at the Kaka'ako detention center and the exiled lepers at Moloka'i (Figure 23). This girls' home was named after Queen Kapi'olani, who supported Mother Marianne's plan by raising funds. A two-story dormitory for the girls was built near the sisters' chapel (Hanley and Bushnell 1980:222).

In 1888, the Board of Health decided to close the Kaka'ako Branch, moving the receiving station to Kalihi; they determined that "The buildings at Kakaako should be entirely removed" (Hanley and Bushnell 1980:275). The hospital and several other of the larger buildings were dismantled and transported for use at Moloka'i (Daws 1984:xxiii), but a few buildings remained, and Kaka'ako continued to be used as a temporary leprosy receiving station. In 1889, the Kapi'olani School for Girls also was moved to Kalihi (Hanley and Bushnell 1980:326). The



Figure 22. 1886 photograph of patients' Oceanside cottages at the Kaka'ako Leper Detention Center (reprinted in Hanley and Bushnell 1980: photograph section)



Figure 23. 1886 photograph of the Kapi'olani Home for Girls within the Kaka'ako Leper Detention Center; Mother Marianne Copeland is the second woman from the right (reprinted in Hanley and Bushnell 1980: photograph section)

buildings were torn down and the new immigration station was built on the former grounds of the home. Thrum (1897:101) reports that victims of the cholera epidemic of 1895 were treated at the Kaka'ako Hospital, suggesting the remaining buildings were modified or a new hospital was built during this time.

In 1899, the first case of bubonic plague was identified in Hawai'i and spread rapidly through the crowded tenements of Chinatown. The government decided the best way to eradicate the disease was through "controlled burning" of the wooden buildings. Infected patients were moved to a quarantine camp at Kaka'ako. Some people, not necessarily patients, whose houses were burned were housed at the barracks of the Kaka'ako Rifle Range, and their belongings were stored in the cellars of Kaumakapili Church. On 20 January, a fire set in Block 15 between Kaumakapili Church and Nu'uaniu Avenue quickly got out of control. No one was killed in the fire, but Chinatown was destroyed. Many people were homeless, and also bereft of all belongings, lost when Kaumakapili Church burned to the ground (Iwamoto 1969:122-124, 130-131).

In 1905, the Kaka'ako area was used for the incineration of the waste from urban Honolulu. Thomas Thrum reported,

Early in the year was completed the long projected garbage crematory for the disposal, daily, of the city's refuse by a patent and sanitary process. It is located on the shore of Kakaako, adjoining the sewer pumping station; is two stories in height and built of brick. [Thrum 1906:177]

The dredging of Honolulu harbor and its channel is completed as far as planned for the present, and excavations for the Alakea and Kinau slips finished, the material therefrom being used to fill in a large area of Kakaako and the flats in the vicinity of the sewer pumping station and garbage crematory. The amount of material removed by the Federal dredging was a million and a half cubic yards. [Thrum 1907:148-149]

#### 3.1.3.4 Military Works at Kaka'ako, Ka'ākaukukui, and Kukuluāe'o

During the monarchy, the point at Kaka'ako was the location for a battery. Its three cannons were used to salute visiting naval vessels, which responded with their own cannon salutes. Other saluting batteries were at the top of Punchbowl Crater and at the Honolulu Fort (Dukas 2004:163). The *Hawaiian Annual and Almanac for 1887* (Thrum 1887:37) reported \$4,500 had been spent to build the battery, which was used for gun salutes up to at least the end of the monarchy in 1893 (Judd 1975:57), as shown on an 1887 photograph (Figure 24) and a 1887 map (see Figure 16).

After the annexation of the Islands by the United States in 1899, the U.S. Congress began to plan for the coastal defenses of their new lands. The major batteries were placed at Pearl Harbor and in Waikīkī, but a small reservation named Fort Armstrong was also set up on the Ka'ākaukukui Reef as a station for the storage of underwater mines.

The fort does not seem to have been very impressive. William Castle in 1917 noted,

Fort Armstrong is the saluting station for the port of Honolulu. It is built on the Kaakaukukui Reef, one mile from the centre of the city and at the entrance of the

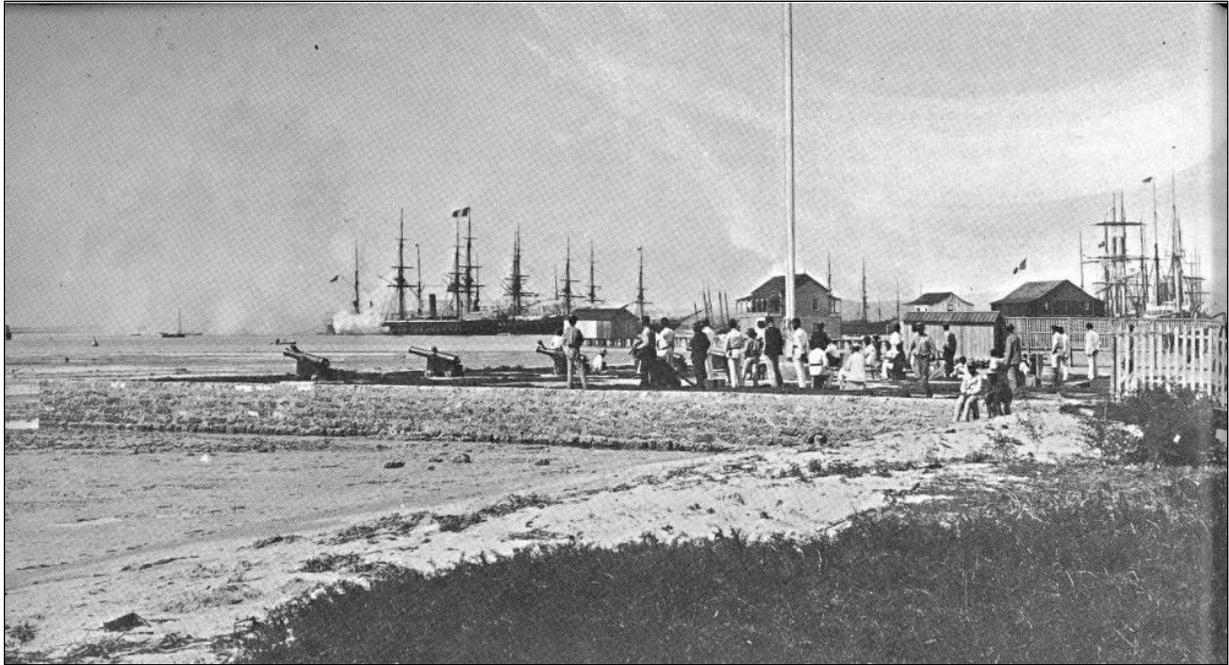


Figure 24. 1887 photograph of the Kaka'ako Saluting Battery and flagstaff (original photograph taken by Karl Kortum and archived at the San Francisco Maritime Museum; reprinted in Scott 1968:176)

harbour. Its area is 64 acres, and it has as garrison the 104<sup>th</sup> Company (mine) of the Coast Artillery Corps. Both officers and men are wretchedly housed in temporary board and batten shacks, although the fort has been in use for three years. [Castle 1917:90]

The fort saw some small action during World War I when, in October 1917, the military authorities closed Honolulu Harbor between sunset and sunrise. The steamer *Claudine*, sailing from Maui when the edict went into effect, sailed into Honolulu Harbor unknowingly after twilight. The coast artillery at Fort Armstrong shot a few shells across her bow, and the steamer quickly reversed her engines and went back out to sea until the following morning, when she could safely and legally come to shore (Thomas 1983:147).

In the attack on the Islands on 7 December 1941, the fort escaped relatively unscathed; only one motor pool structure was hit. Antiaircraft shells were fired from the fort, but were ineffective; at least one hit the town rather than any aircraft (Richardson 2005:34). In the 1950s, the federal government returned most of Fort Armstrong to the Territory of Hawai'i, which used the area to expand the shipping piers of the harbor.

### 3.1.3.5 Honolulu Iron Works

In the 1850s, Hawaiian sugar planters became interested in a type of centrifugal machine that could separate sugar from molasses. In 1851, an engineer named David Weston installed his version of this machine in a Maui sugar mill. With backing from Hawaiian businessmen, Weston returned to the Islands in 1853 and founded the Honolulu Iron Works (Figure 25), which he set up in a building already occupied by a flour mill (Kuykendall 1938:326-327). The flour mill was at first the most successful part of the business, where wheat from Maui and as far away as Chile was ground into flour and then exported to California. However, as the sugar industry became more prominent in the Hawaiian Island economy, the Iron Works began to build the machinery needed to operate the new sugar mills, not only in Hawai'i but all over the world. At one point, the iron works employed 1,500 workers, many of whom lived in the Kaka'ako area (Nicol 1998:510).

Business began to decline in the 1950s, and in 1973 the works were closed (Nicol 1998:510). At first the old buildings were converted to retail space, but eventually all were torn down; the last warehouse was demolished in 1982 (Kawasaki 2005:2). The main lot for this complex is now covered by One Waterfront Plaza, northwest of the current project area.

### 3.1.3.6 Kaka'ako Land Reclamation

The first efforts to deepen Honolulu Harbor were made in the 1840s. The idea to use this dredged material, composed of sand and crushed coral, to fill in low-lying lands, was quickly adopted. From 1857 to 1870, the "Esplanade" between Fort and Alakea streets was created on 22 acres of filled-in former reef and tideland. By 1874, Sand (Quarantine) Island, site of the first immigration station, had been created over "reclaimed" land on reefs (Hawaii Board of Health 1902).

By the 1880s, filling in of the mud flats, marshes, and salt ponds in the Kaka'ako area had begun. This filling was pushed by three separate but overlapping improvement justifications. The first directive or justification was for the construction of new roads and improving older roads by raising the grade so improvements would not be washed away by flooding during heavy rains. A



Figure 25. 1901 (ca.) photograph of the Honolulu Iron Works complex; note the empty lots east of the complex; the study parcels would be to the east or right of this complex (original photograph at Bernice Pauahi Bishop Museum; reprinted in Myatt 1991:40-41)

report by the Hawaii Board of Health (1908) noted the following:

I beg to call attention to the built-up section of Kewalo, 'Kaka'ako,' where extensive street improvements, filling and grading have been done. This, no doubt, is greatly appreciated and desirable to the property owners of that locality, but from a sanitary point of view is dangerous, inasmuch as no provision has been made to drain the improved section, on which have been erected neat cottages occupied for the greater part by Hawaiian and Portuguese families, now being from one to three feet below the street surface, and which will be entirely flooded during the rainy season. Unless this is remedied this locality will be susceptible to an outbreak [of cholera] such as we experienced in the past. [Hawaii Board of Health 1908:80]

The second, and most frequently used, justification for filling was driven by public health and sanitation, the desire to clean up rivers and ponds that were reservoirs for diseases such as cholera and that acted as breeding places for rats and mosquitoes. Thus, as early as 1902 it is reported that

The Board has paid a great deal of attention to low-lying stagnant ponds in different parts of the city, and has condemned a number of them. The Superintendent of Public Works has given great assistance to seeing that the ponds condemned by the Board are filled. In September a pond on South Street was condemned as deleterious to the public health. [Hawaii Board of Health 1902:80]

The first areas to be filled were those closest to Honolulu town, then areas moving outwards to Kaka'ako (Griffin et al. 1987:13). The first fill material may have been set down in 1881 for the Kaka'ako Leper Branch Hospital (between Coral and Keawe streets), which had been built on a salt marsh. Laborers were hired to "haul in wagon loads of rubble and earth to fill up that end of the marsh" (Hanley and Bushnell 1980:113). In 1903, five more lots in Kewalo, on Laniwai, Queen, and Cooke streets, were condemned and ordered filled (Hawaii Board of Health 1903:6).

Although public health and safety were prominently cited, according to Nakamura (1979), the third justification or main desire for filling in Honolulu, Kewalo, and then Waikīkī lands was to provide more room for residential subdivisions, industrial areas, and finally tourist resorts. In the early part of the twentieth century, Kaka'ako was becoming a prime spot for large industrial complexes such as iron works, lumber yards, and draying companies, which needed large spaces for their stables, feed lots, and wagon sheds. In 1900, the Honolulu Iron Works, which produced most of the large equipment for the Hawaiian plantation sugar mills, moved from their old location at Queen and Merchant Street near downtown Honolulu to the shore at Kaka'ako, on land that had been filled from dredged material during the deepening of Honolulu Harbor (Thrum 1901:172). Other businesses soon followed. Thrum (1902) noted,

The Union Feed Co. is another concern whose business has outgrown the limits of its old location, corner of Queen and Edinburgh streets. Like the Iron Works Co. they have secured spacious premises at Kakaako, erecting buildings specially adapted to the needs of their extensive business at the corner of Ala Moana (Ocean Road) and South Street. [Thrum 1902:168]

Private enterprises were not the only new occupants of Kaka'ako. A sewer pumping station, an immigrant station, and a garbage incinerator were also built on "reclaimed land" located in the vicinity of the current project area, across Ala Moana Boulevard. Thrum (1907) noted,

The dredging of Honolulu harbor and its channel is completed as far as planned for the present . . . the material there from being used to fill in a large area of Kakaako and the flats in the vicinity of the sewer pumping station and garbage crematory. [Thrum 1907:148-149]

For the incinerator, Thrum (1907) noted,

The new station is built on piles on reclaimed land that is being filled in from the coral dredgings that is going on, and is gradually taking on a tropical appearance. . . . Adjoining its premises on the mauka side is the new building designed for the Planters' Association for their labor bureau. [Thrum 1907:148-149]

The new immigration station had seven large rooms for dormitories surrounded by a breezy, open *lanai* where immigrant workers would stay while waiting for their clearance to go to their new work places on the sugar plantations. Adjacent to the dormitory was a hospital, which was used to check the new immigrants for any "loathsome or dangerous contagious disease" (Hawaii Governor 1905:77). The hospital was also used during epidemics to isolate contagious patients suffering from such diseases as smallpox, cholera, or plague.

In 1900, a Kewalo area pond surrounded by a bicycle racing track, called the Cyclomere (built in 1897), was filled. The pond was located on the *makai* side of Kapi'olani Avenue between Cooke Street and Ward Avenue. In 1904, the area around South Street from King to Queen streets was filled in. The Hawaii Department of Public Works (1904) identified the need for considerable in-filling for the extension of Queen Street was required, from South Street to Ward Avenue.

### 3.1.3.7 Kewalo Reclamation Project

Although the Board of Health could condemn a property and the Department of Public Works could then fill in the land, the process was rather arbitrary and piecemeal. In 1910, after an epidemic of bubonic plague, the Board of Health condemned a large section of Kewalo, consisting of 140 land parcels (including areas in Ka'ākaukui), which had numerous ponds (Hawaii Department of Public Works 1914:196).

In 1914, the entire

. . . locality bounded by King street, Ward avenue, Ala Moana and South street, comprising a total area of about two hundred acres, had been found by the board of health of the Territory to be deleterious to the public health in consequence of being low and below 'the established grades of the street nearest thereto' and at times covered or partly covered by water and improperly drained and incapable by reasonable expenditure of effectual drainage, and that said lands were in an insanitary and dangerous condition. [Hawaii Supreme Court 1915:329].

The superintendent then sent a letter to all of the property owners, informing them that they must fill in the lands to the grade of the street level within sixty days. Only a few of the land owners complied, and filled their land with a variety of materials. Most of the land owners did not comply with this notice, and in 1912 the bid to fill in the land was given to Lord-Young Engineering Company to fill in the land with "sand, coral and material dredged from the harbor or reef and the depositing of the same upon the land by the hydraulic method" (Hawaii Supreme Court 1915:331).

The recalcitrant land owners sued to stop the work, and in the suit, the method of hydraulic filling is described as follows:

By this [hydraulic] method the material dredged is carried in suspension or by the influence of water which is forced through large pipes and laid upon the lands and intervening streets, and afterwards is distributed and leveled, the water having drained off through ditches provided for the purpose. The work is done in large sections around which bulkheads have been constructed. A section can be filled in about thirty days, the dredger working about fifteen hours per day. And in about two months after a section has been filled the ground will have dried out so as to be fit for use as before. . . . The character of the material varies from very fine sand to coarse bits of coral . . .

It appears in evidence that though the method employed the finest of the material which is carried upon the land settles when the water which transports it becomes quiet and as the water runs off a sludge or mud remains which forms a strata more or less impervious to water. This strata, however, is covered by the coarser and more porous material. . . . it appears that by mixing in to a depth of a few inches ordinary soil small plants will grow without difficulty. . . . The character of the locality must be considered. It is not adapted to agriculture, but is suited more particularly to such business purposes as it now partly used for, such as stables, laundries, warehouses, mills, etc., and for cottages with small yards for the accommodation of laborers engaged in connection therewith. Upon the whole, we are of the opinion that the material proposed to be used in the fill-in of the lands of the complainants is not of a character as should be held to be improper for any of the reasons urged. [Hawaii Supreme Court 1914:351]

The first land to be filled in was the portion of the Ward Estate Kukuluāe‘o property west of Ward Avenue, completely filled in by June 1913. In July “25,000 cubic yards of sand and ground-up coral were deposited on the Bishop Estate in the vicinity of Ala Moana and Keawe street, the reason for shifting operations to this part of the district being that the Hawaiian Sugar Planter’s Association had erected a reinforced concrete building there and wished to have the lot brought to grade” (Hawaii Department of Public Works 1914:198). By August, the rest of the Ward Kukuluāe‘o lands west of Ward Avenue had been completely filled in, and by February 1914, all of the land from South Street to Ward Street, and from Ala Moana to Queen Street had been filled. This would include the current project area.

The expense of the suit did manage to shut down operations planned for the area from Ward Street to Waikīkī (Thrum 1916:159-160). This land was mainly owned by the Bishop Estate, which leased the land to small farmers growing taro and rice and raising ducks in the ponds. In 1916, the Bishop Estate announced that as soon as their present tenant leases expired, they planned to fill the lands and divide them into residence and business lots (Larrison 1917:148-149). In 1919, a portion of the coastal section of the Bishop Estate lands was secured by the government in order to expand the Kewalo Basin (Thrum 1920:148).

### 3.1.4 Early Twentieth Century to the Present

#### 3.1.4.1 Urban Expansion in the Kaka'ako Area

The 1884 Bishop map (see Figure 15) shows the nascent traces of the future development in the grid of roads stretching *mauka* of the project area. Kaka'ako was considered outside the Honolulu town boundary and was used in the mid- to late nineteenth century as a place for cemeteries, burial grounds, and for the quarantine of contagious patients. Then in the beginning of the twentieth century, the area was used as a place for sewage treatment and garbage burning, finally becoming an area for cheap housing and commercial industries (Griffin et al. 1987:13). Late nineteenth century maps show a corridor of streets extending diagonally from Honolulu Town including Queen Street, planned to connect to the beach road to Waikīkī. The Queen Street alignment appears to follow the route of the traditional trail from Kou (Honolulu) to Waikīkī described by John Papa 'I'i. As noted previously, this trail likely ran on a sand berm raised above the surrounding marshlands and coral flats. The three ponds northwest of the project area are still present.

A series of USGS (or wartime U.S. Army) quadrangles show the gradual expansion of the Honolulu urban district to the edge of Kaka'ako and beyond in the early twentieth century. During the first half of the twentieth century, both rice fields and marshlands were eliminated as Kaka'ako lands were filled to accommodate the expanding urbanization of Honolulu.

On a 1919 map (Figure 26), early twentieth century residences were clustered between Pohukaina and Queen streets, one to two blocks northeast of the project area. Proposed streets extending to Waikīkī are dotted in, indicating the roads have not been built or improved (paved) by this time. As noted in the previous section, the project area would have been completely filled in by 1914 during road improvement projects and the Kaka'ako and Kewalo reclamation projects. All of the ponds and low-lying areas around the project area have been filled, and new land for Fort Armstrong has been created from dredged material.

On a 1927 topographic map (Figure 27) and aerial photograph (Figure 28), the open areas of Kaka'ako have been filled with material dredged from the Ala Wai Canal, Ala Moana Beach Park, the on-going excavation of Kewalo Basin, and with material from the city incinerator at the Kewalo coastline. The 1927 aerial photograph shows a large cluster of homes within the south corner of the project area with a vegetated area directly to the north. The remainder of the project area consists of large open areas with a few larger structures.

On a 1952 aerial photograph (Figure 29), the large cluster of homes within the south corner of the project area is still present, but the vegetated area to the north has been cleared. Additionally the western half of the project area is no longer clear, and is now covered with a smaller cluster of homes and a few larger structures.

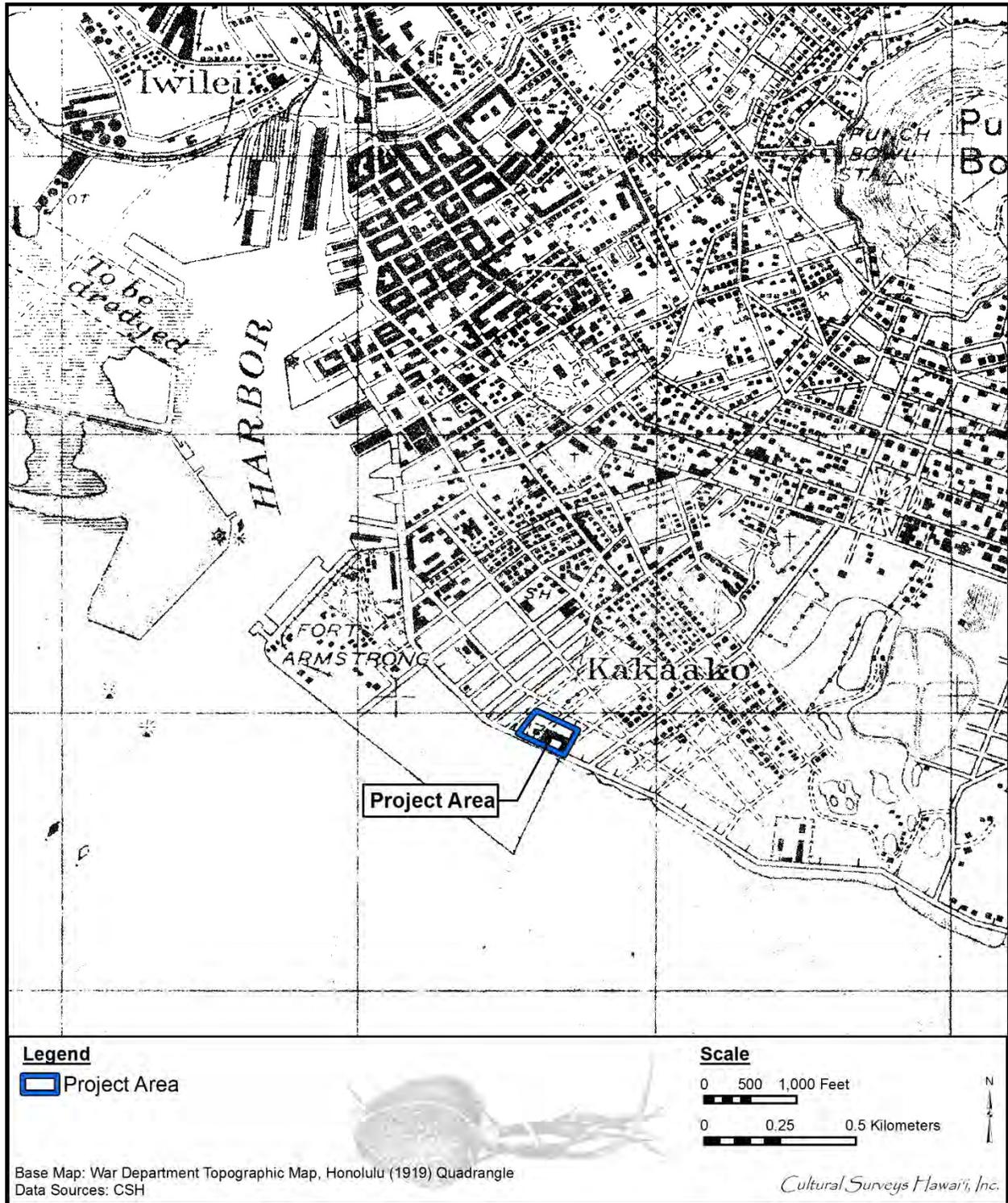


Figure 26. 1919 War Department map (Honolulu Quadrangle) showing location of the project area

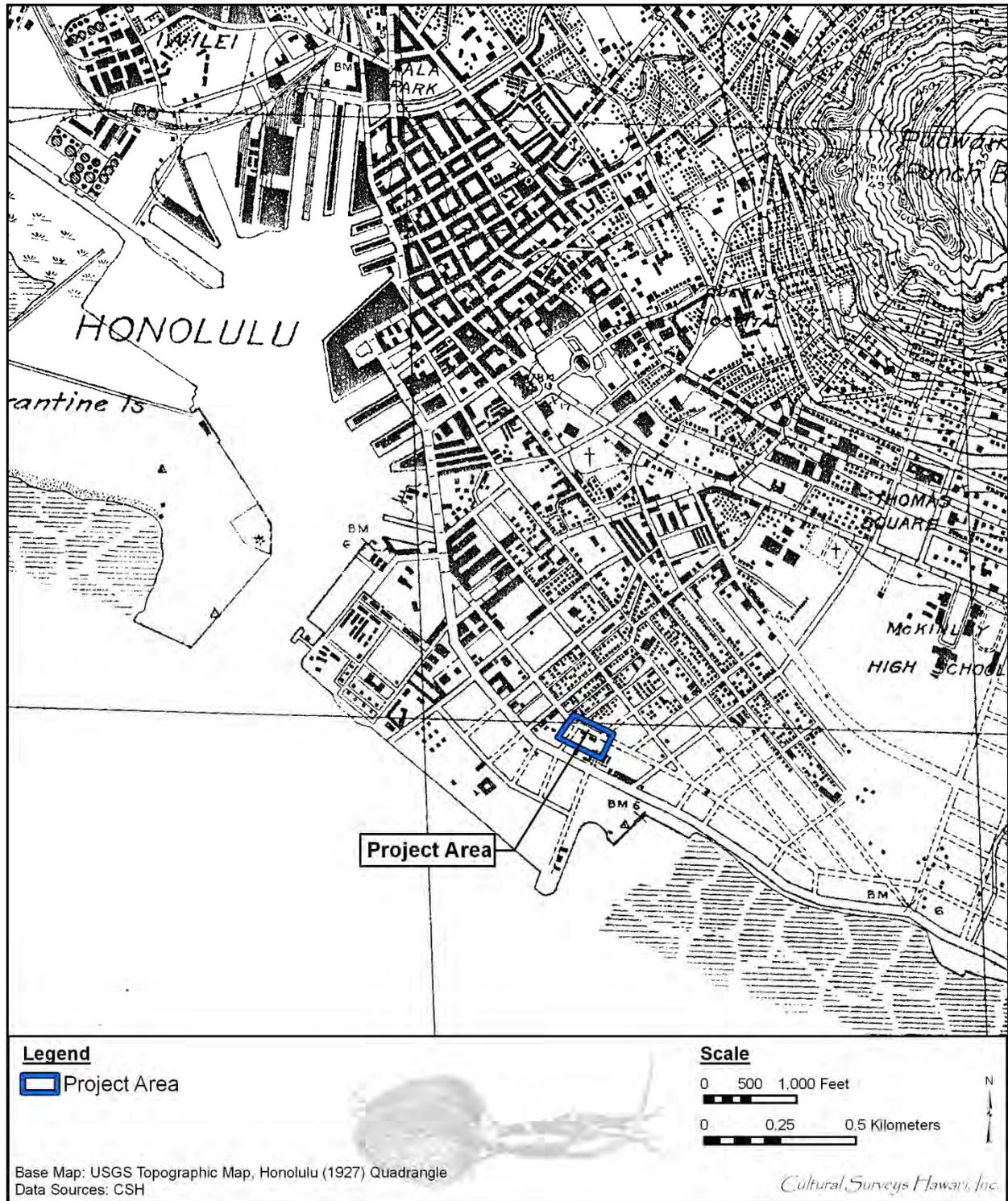


Figure 27. 1927 Honolulu USGS quadrangle showing the project area location



Figure 28. 1927 aerial photograph of the Waikiki coast (University of Hawai'i School of Ocean and Earth Science and Technology [SOEST]) showing the project area location



Figure 29. 1952 aerial photograph of the Kaka'ako coast (University of Hawai'i School of Ocean and Earth Science and Technology [SOEST]) showing the project area location

### 3.1.4.2 Fire Insurance Maps

A series of fire insurance maps illustrates the history of the project area in greater detail. At the University of Hawai'i at Mānoa, the Dakin Fire Insurance maps for 1891, 1899, and 1906 and the Sanborn Fire Insurance maps for 1914, 1927, 1950, and 1956 are available. The current project area is not shown on any of the Dakin Fire Insurance maps for 1891, 1899, or 1906, suggesting there were no permanent structures in the area in those years. Sanborn Fire Insurance maps for 1914, 1927, 1950, and 1956 for the project area are illustrated in Figure 30 through Figure 33.

#### 1914 Sanborn Fire Insurance Map

The 1914 map indicates the project area was being utilized by the Union Feed Company as a stable (see Figure 30). Union Feed Company operations seemed to be focused within the *makai* portion of the parcel, and may reflect areas that contained dry land. Large wagon sheds appear to form the perimeter of the stable. Of note are two dwellings just west of the stable, located along the *makai* edge of the project area.

#### 1927 Sanborn Fire Insurance Map

By 1927, the project area has undergone drastic changes. The Union Feed Company stable has been replaced by a large cluster of dwellings situated within the Diamond Head-*makai* corner of the project area (see Figure 31). Corrals and associated infrastructure (i.e., hay storage sheds and dwellings) are now present within the central portion of the project area. A boat building with associated dwellings and a kitchen are present within the 'Ewa-*makai* corner of the project area. And a contractors' base yard with associated storage facilities is present within the 'Ewa-*mauka* corner of the project area.

#### 1950 and 1956 Sanborn Fire Insurance Maps

By 1950, the dwellings within the Diamond Head-*makai* corner are still present, as are the corrals and boat building along the *makai* edge of the project area (Figure 32). Of note are the numerous dwellings now present within the 'Ewa portion of the project area. A concentration of warehouses and storage facilities is also present within the 'Ewa-*mauka* corner of the project area.

By 1956, the large concentration of dwellings within the Diamond Head-*makai* portion of the project area are now gone. The 'Ewa portion of the project area remains relatively unchanged, with some of the dwellings shown in the 1950 map now gone.

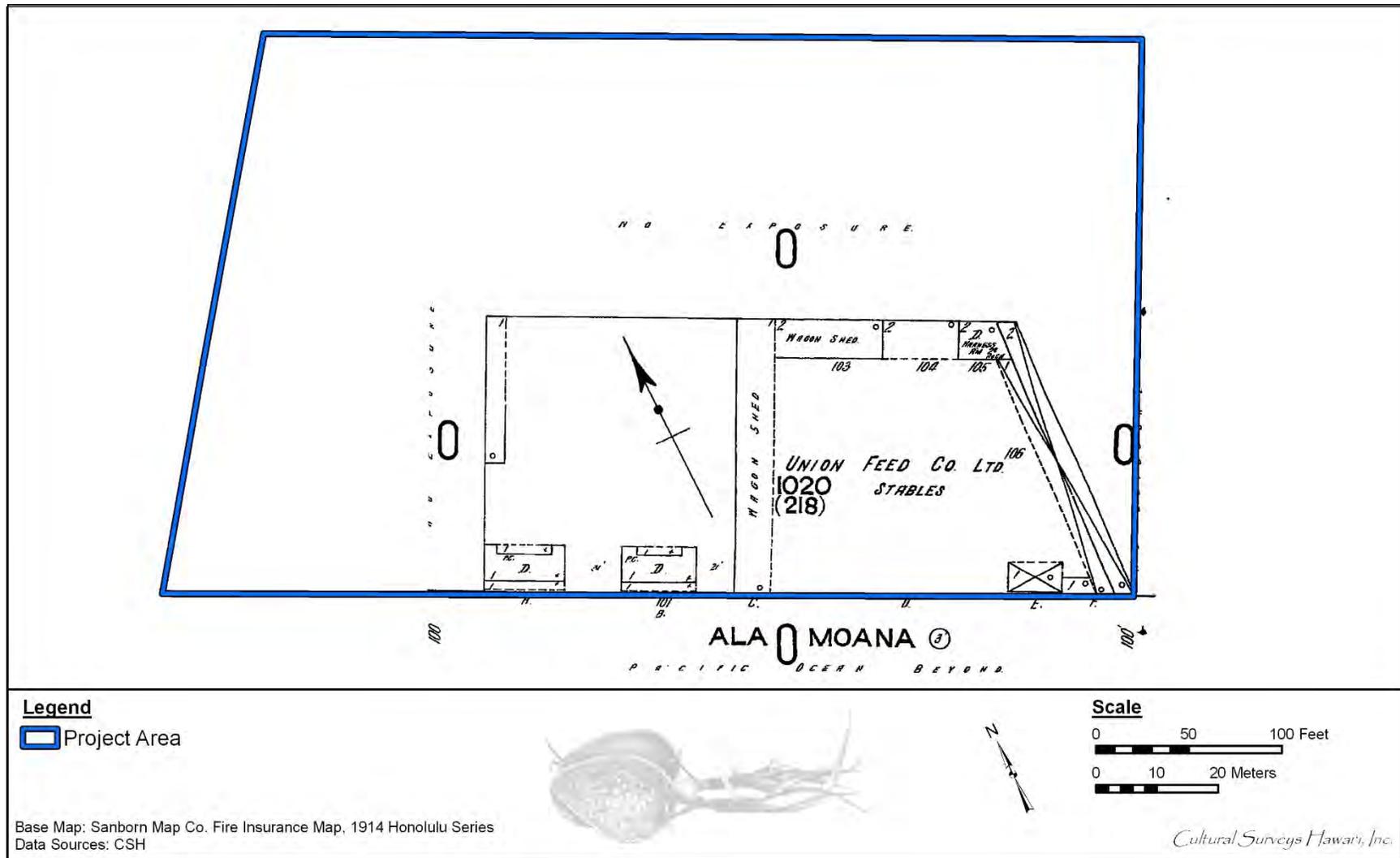


Figure 30. 1914 Sanborn Fire Insurance Map showing the project area location

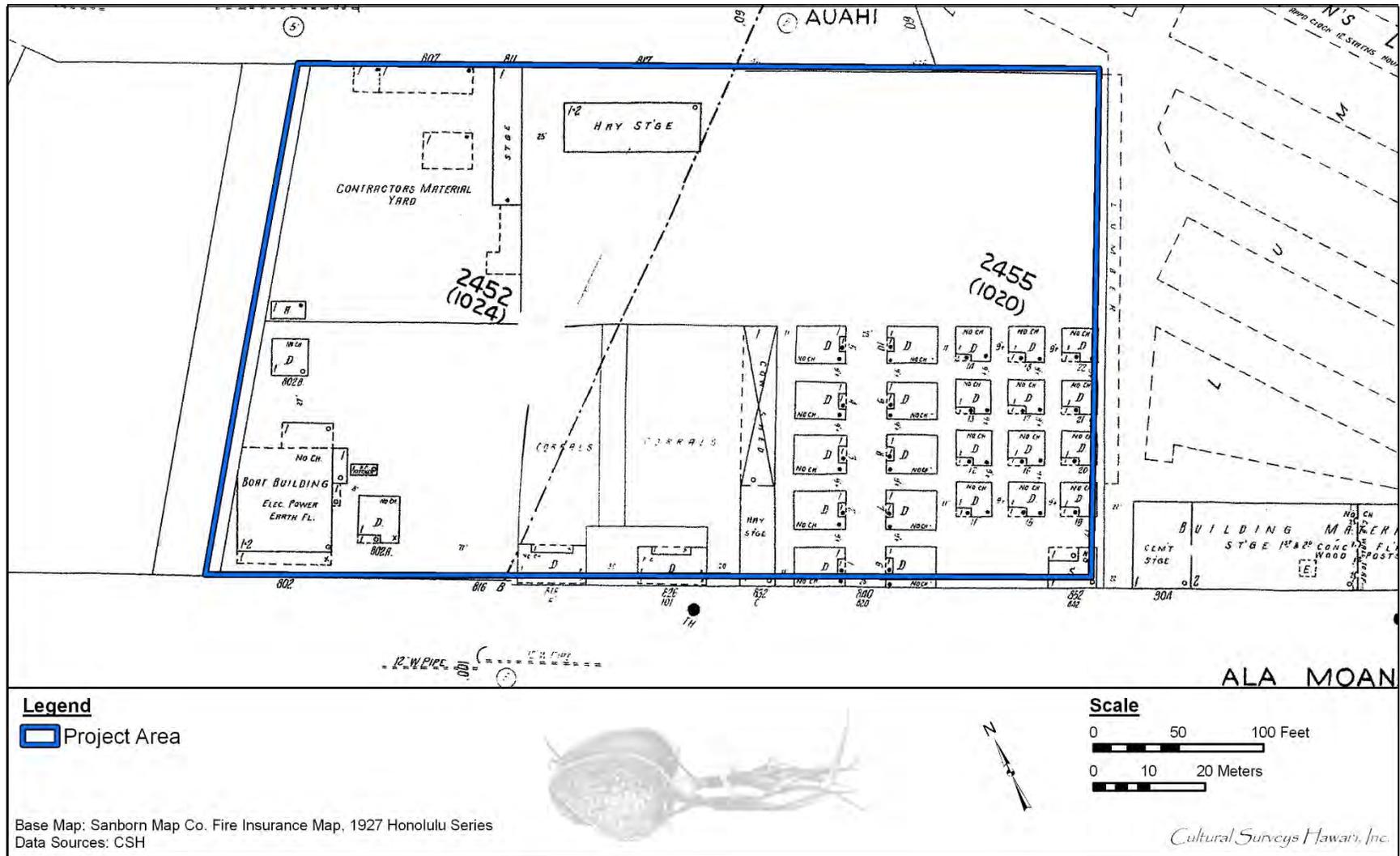


Figure 31. 1927 Sanborn Fire Insurance Map showing the project area location

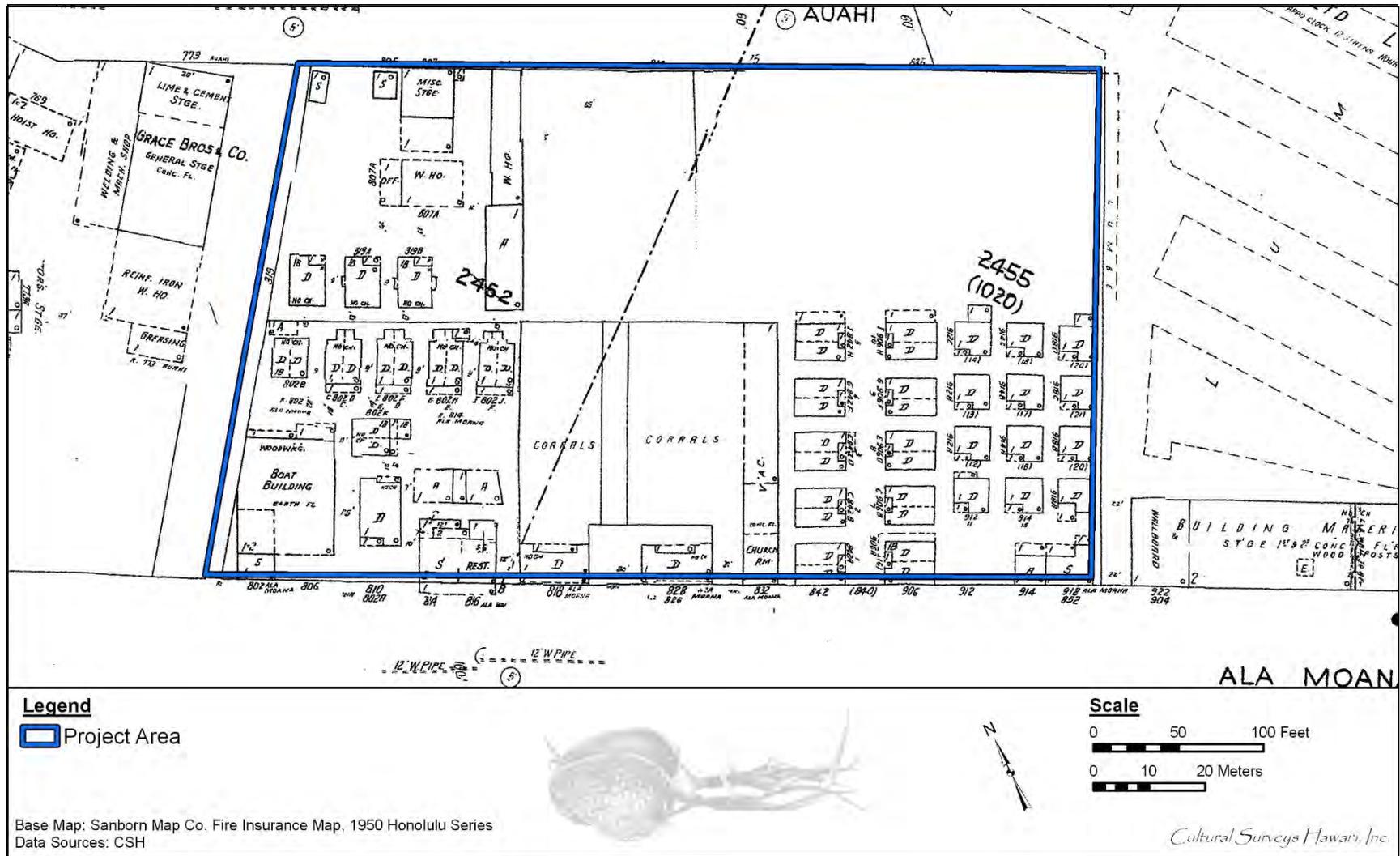


Figure 32. 1950 Sanborn Fire Insurance Map showing the project area location

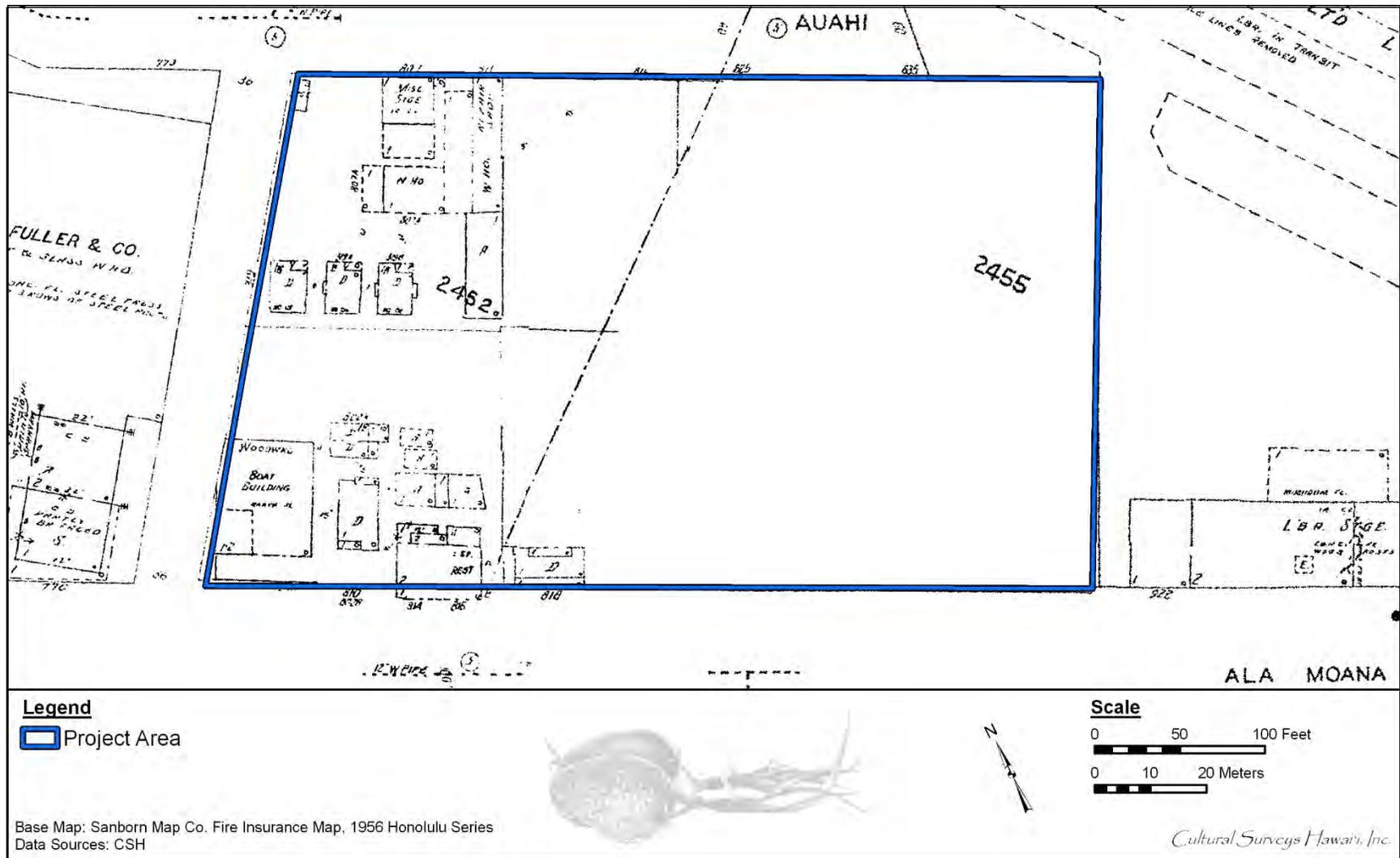


Figure 33. 1956 Sanborn Fire Insurance Map showing the project area location

## 3.2 Previous Archaeological Research

Most traditional Hawaiian surface structures had been demolished by the time of the first scientific archaeological surveys in the early twentieth century. In his report on the survey of O'ahu sites conducted in the early 1930s, McAllister (1933:80) says of Honolulu, "Information regarding former sites within the present limits of Honolulu must come entirely from literary sources."

Archaeological investigations have been conducted in parcels adjacent to the project area and in road alignments near and/or immediately adjacent to the project area. Figure 34 and Figure 35 show the location of these previous archaeological studies and identified sites (with known locations), including burials. Previous archaeological projects are listed in Table 4, and findings of these investigations are summarized below.

### 3.2.1 Punchbowl to South Street

#### 3.2.1.1 Honuakaha Smallpox Cemetery

Pfeffer et al. (1993) reported on archaeological monitoring of construction activities in the Kaka'ako ID-1 project area, including along South Street and Quinn Lane. Historic research had shown that Honuakaha Cemetery, created solely for the 1853-1854 smallpox epidemic, was located *makai* of Queen Street on the west side of South Street. This cemetery is now covered by urban development, including the Old Kaka'ako Fire Station, several other buildings and a portion of the American Brewery lot. The cemetery may contain more than 1,000 burials. It appears the cemetery was not utilized following the epidemic and that the burials were left in place.

Thirty-one burials in the Honuakaha Cemetery (SIHP # 50-80-14-3712) were encountered and recorded during the 1986-1988 monitoring (Pfeffer et al. 1993). One of the "burials" consisted of a wooden coffin with no human skeletal remains. Of the remaining 30 burials, 28 were disinterred. Two burials, determined to be outside the project area, were left in place. For the 28 disinterments, 18 were determined to be historic, as they were interred in an extended position and contained historic artifacts, including in 12 cases, the wooden remains of a coffin. Two burials were interpreted as possible pre-Contact burials as they were interred in a sand layer and did not have any evidence of a wooden coffin or any historic artifacts. The remaining eight burials were too disturbed to determine date of interment.

In March and April 1993, during sewer line excavation by Mouse Construction, three burials were inadvertently discovered at 614 South Street in the central portion of the lot (TMK: [1] 2-1-031:020) on the southwest corner of South Street and Quinn Lane. These burials were situated in the Honuakaha Cemetery (SIHP # 50-80-14-3712). Subsequent monitoring of the site identified six additional burials in the same location, totaling nine smallpox cemetery burials in this area (Avery and Kennedy 1993).

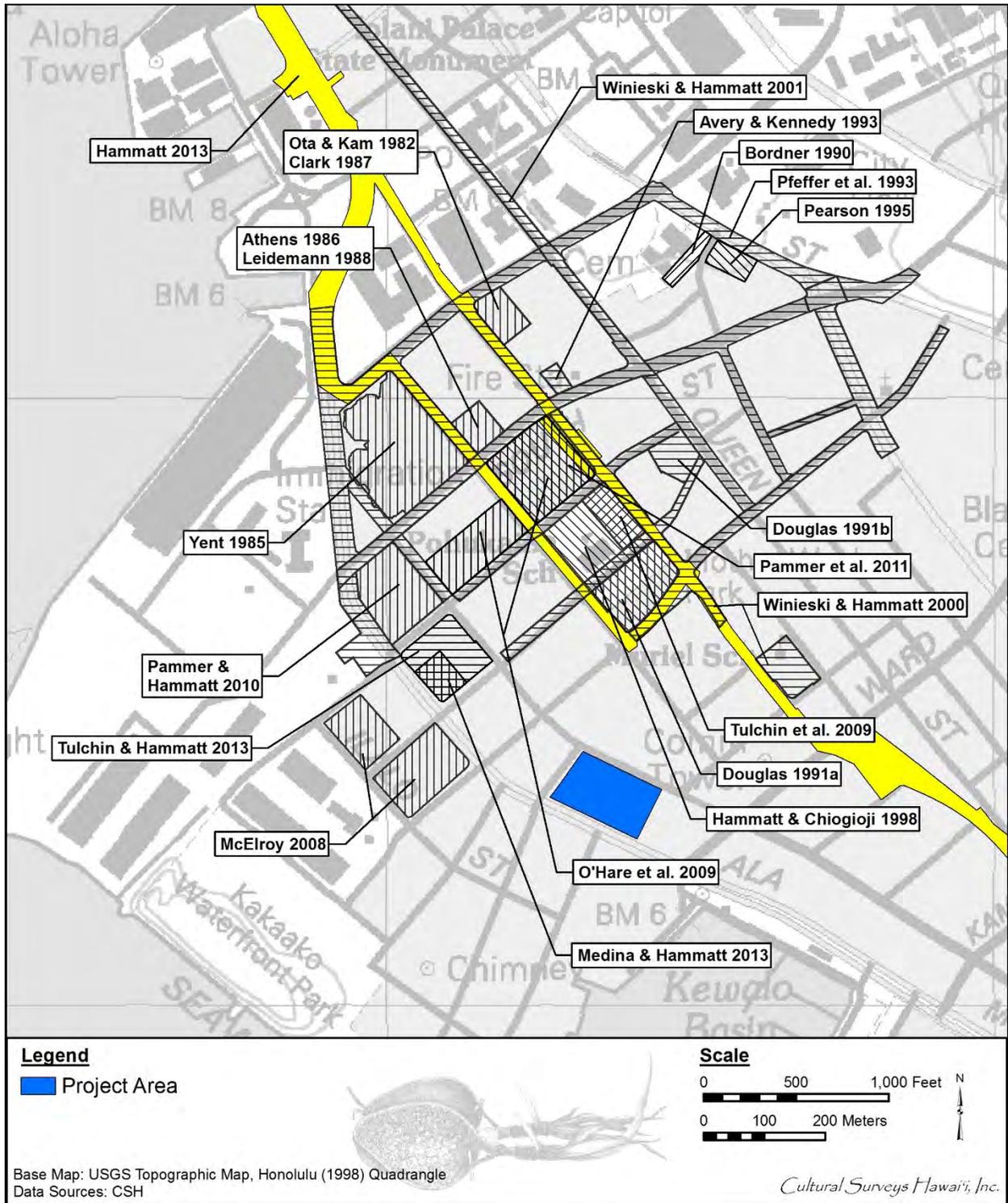


Figure 34. Previous archaeological studies in the vicinity of the project area

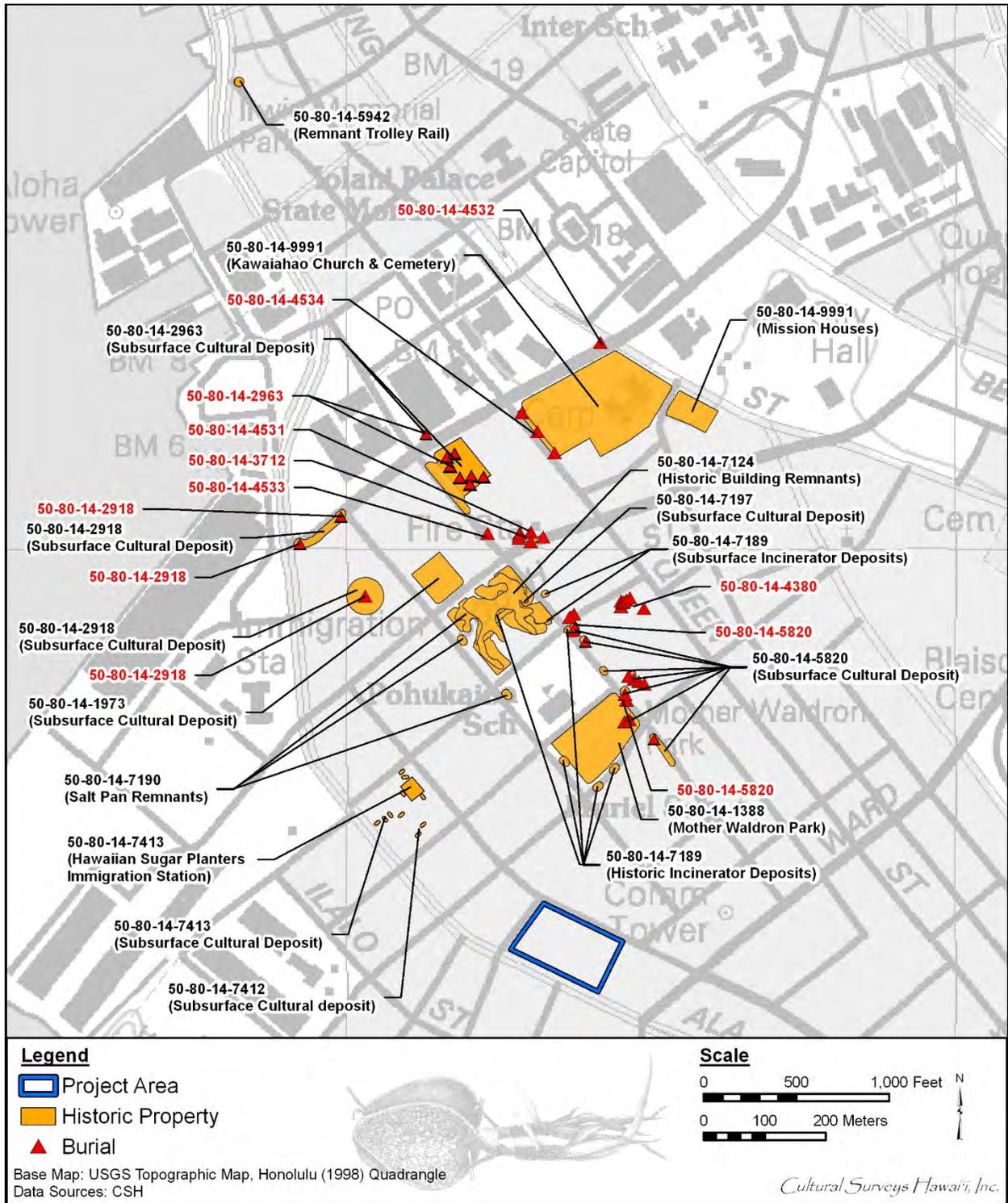


Figure 35. Historic properties identified in the vicinity of the project area

Table 4. Previous Archaeological Work in Kaka'ako Near the Project Area (All SIHP #s Begin with 50-80-14-)

Author	SIHP #(s)	Report Description and Results (See Figure 33 and Figure 34 for Map Locations of Studies and Sites)
Ota and Kam 1982	2963	Makai Parking Garage; six partial burial sets (SIHP # -2963) found; probable pre-Contact to 1850 date
Yent 1985	2918	Ka'ākaukukui Cemetery (SIHP # -2918) at the Honolulu Iron Works project area; five burials (SIHP # -2918) recorded
Athens 1986	1973	Monitoring of Judiciary Parking lot; historic deposits (SIHP # -1973) with artifacts dating late nineteenth-early twentieth centuries
Clark 1987	2963	Monitoring at Makai Parking Garage; seven burials (SIHP # -2963) found probably dating to pre-1850
Leidemann 1988	1973	Monitoring at Federal parking lot; historic deposits (SIHP # -1973) found
Bordner 1990	9991	Test trenches excavated in the Kawaiaha'o Church grounds (SIHP # -9991); some historic artifacts recovered
Douglas 1991a	4380	Coral and Queen Street area; eight burials (SIHP # -4380) recorded and five disinterred
Douglas 1991b	4380	Coral and Queen Street area; one burial recorded (SIHP # -4380)
Avery and Kennedy 1993	3712	Monitoring of South Street Building Complex; six burials associated with 1853-1854 Honuakaha Smallpox Cemetery (SIHP # -3712) found
Pfeffer et al. 1993	3712/4531 4532 4533 4534	Monitoring for Kaka'ako ID-1; 31 historic burials at the South Street/Quinn Lane junction; 116 historic burials from Kawaiaha'o Cemetery (SIHP # -4534) (used from 1825-1920) at Queen Street found; isolated burials found at SIHP # -4532 (one individual) and SIHP # -4533 (one individual)
Pearson 1995	9991	Test pits excavated near the Mission Houses (SIHP # -9991); nineteenth and twentieth century artifacts recovered
Hammatt and Chiogioji 1998	1388	Archaeological assessment of area that includes Mother Waldron playground (SIHP # -1388) and Pohukaina Elementary School; no field work

Author	SIHP #(s)	Report Description and Results (See Figure 33 and Figure 34 for Map Locations of Studies and Sites)
Winieski and Hammatt 2000	4380 5820	Monitoring at Kaka‘ako ID-3 and other parcels; nine burials found at the Pohulani Housing area (SIHP # -4380) and 11 human burials (SIHP # -5820) found at Mother Waldron Park; at least two were interred in the post-Contact period
Winieski and Hammatt 2001	5942	Monitoring for the Nimitz Hwy Reconstructed Sewer Project; historic artifacts and features observed (including SIHP # -5942)
McElroy et al. 2008	None	Test excavations showed study area consisted of former reef flats filled in during the early 1900s
O’Hare et al. 2009	None	Inventory survey plan for three Kamehameha Schools parcels, including Block B, the current project area; seven test excavations conducted at Block B; subsurface testing indicated presence of thick fill deposits overlying naturally deposited marine clay; noted presence of historic trash layer
Tulchin et al. 2009	None	Archaeological inventory survey of Halekauwila Place; 18 test trenches excavated; no pre-Contact material recorded; numerous historic artifacts found dating to the late nineteenth/early twentieth century
Pammer and Hammatt 2010	None	Archaeological inventory survey (former Comp USA parcel for Kamehameha Schools); 19 test trenches indicated study area consisted of former reef flats filled in during the early 1900s
Pammer et al. 2011	7124 7189 7190 7197	Archaeological inventory survey of Kamehameha Schools Block 2 Parking Lot; including work from CSH’s archaeological inventory survey plan (O’Hare et al. 2009) during which five trenches were excavated; excavated 83 trenches in all, resulting in identification of four subsurface historic deposits: two historic-era layers (SIHP #s -7124 and -7189), salt-pan deposits (SIHP # -7190) and a late pre-Contact/early historic cultural layer (SIHP # -7197)
Medina and Hammatt 2013	7413 Feature B	Archaeological monitoring of 680 Ala Moana building located within Kamehameha Schools Kaka‘ako Block F; observed stratigraphy consisted predominantly of imported fill associated with historic land reclamation; Jaucas sands observed in portions of study area; noted presence of buried concrete slabs that correspond with historic building footprints based on historic fire insurance maps spanning from the 1920s to the 1950s (SIHP # -7413 Feature B)

Author	SIHP #(s)	Report Description and Results (See Figure 33 and Figure 34 for Map Locations of Studies and Sites)
Tulchin and Hammatt 2013	7412 7413	Archaeological inventory survey (Kamehameha Schools Kaka'ako Block F); excavated 20 test trenches resulting in identification of two historic properties: SIHP # -7412, a discontinuous subsurface cultural layer containing post-Contact western-introduced cultural material, including crushed red brick, cut faunal bone, glass fragments, slag, and metal fragments; and SIHP # -7413, surface and subsurface features predominantly associated with the property's development and utilization as a Hawaiian Sugar Planters Immigration Station (i.e., a reinforced concrete building, buried concrete structural remnants, and subsurface trash layers)
Hammatt 2013	2918 2963 5820 7124 7189 7190	Archaeological inventory survey for the City Center portion of the Honolulu High-Capacity Transit Corridor Project; identified six previously identified historic properties in the Kaka'ako area from Punchbowl Street to Ward Avenue: SIHP # -2819, subsurface cultural deposit and human burials; SIHP # -2963, subsurface cultural deposit, subsurface pond sediments, human burials, and animal burials; SIHP # -5820, subsurface cultural deposit and human burials; SIHP # -7124, subsurface infrastructure remnants; SIHP # -7189, subsurface burnt trash deposit; and SIHP # -7190, subsurface salt pan remnants

### 3.2.1.2 State Office Building

In 1982, six partial sets of human skeletal remains were recovered during excavation for construction of the State Office Building #2 at the southeast corner of Punchbowl and Halekauwila streets (TMK: [1] 2-1-031:023). The remains were in poor to very poor condition and little could be determined from the osteological analyses performed. Two of the burials showed evidence of incisor evulsion (intentional removal) practiced by Hawaiians into the early post-Contact period; this may indicate the ethnicity of these two burials (Ota and Kam 1982). All other burials were located in both sand and pre-Contact deposits, although some historic disturbance may have taken place. This burial area was later given the designation of SIHP # -2963 (Clark 1987).

### 3.2.1.3 Makai Parking Garage

In 1987, the Bishop Museum (Clark 1987) monitored construction of a parking garage on the southeast corner of Punchbowl and Halekauwila streets in the same TMK parcel as the earlier Ota and Kam (1982) study area. Archaeological features revealed both pre-Contact and post-Contact utilization of the site. Seven human burials were unearthed, of which four were complete burials with well-defined burial pits. Two burials were in a flexed position, one was a bundle burial, and one was too disturbed to determine burial position. Charcoal from one of the burials (Feature 28) was dated to AD 1270-1410. Feature 28 also showed post-mortem breakage of the limb bones. Only the femoral heads were still present in the burial pit; the shafts had been broken off and removed (Clark 1987:75-76). Osteological analyses of the burials and analysis of five grave goods indicated the individuals were of Hawaiian ancestry, probably from the commoner class rather than the chiefly (*ali'i*) class. The burial area was considered part of SIHP # -2963, first identified by Ota and Kam (1982). Artifacts recovered at the site included basalt tools—including an adze, a hammer stone, and a *poi* pounder top—and a coral abrader as well as glass bottles, ceramic fragments and metal objects. Clark concluded the “nineteenth century use of the site area included primarily burying of trash and burial of animals” (Clark 1987:114).

### 3.2.1.4 Judiciary Parking Garage

In 1985, monitoring was conducted for the proposed Judiciary Parking Garage at the northwest corner of Pohukaina and South streets (Athens 1986). In the nineteenth century, this project area would have been in the *'ili* of 'Auwaiolimu, south of three fishponds. No undisturbed sand layers were noted in the excavations and much of the area appeared to have been previously disturbed. It is likely the area was underwater or was intertidal in the pre-Contact period. No pre-Contact cultural deposits or traditional artifacts were recorded, but historic artifacts were common in the several fill layers exposed in the construction trenches. Bottles dating from between 1880 and 1915 were found. The historic deposit was not given a site number at the time of Athens' reporting, although it appears the site designation of SIHP # -3984 was assigned by SHPD at a later time. However CSH believes this site number may have been misrepresented as associated with this historic property, and has discussed this matter with the SHPD. CSH believes the appropriate site number for this historic deposit is SIHP # -1973.

This confusion in site number designations between SIHP # -3984 and -1973 is likely the result of several subsequent studies in the surrounding area indicating inconsistencies in the location of Athen's 1986 project area. In 1985–1986, monitoring for the Federal Judiciary Building parking complex was conducted by the Bishop Museum (Clark 1987). The project area was described as being on the northwest corner of Pohukaina and South streets by Leidemann (1988:1)—who conducted the laboratory analysis of the recovered artifacts—which would make this project area

the same as Athen's (1986) study area. However, on Leidemann's Figure 1 (Leidemann 1988:2), the project area is drawn on the northwest corner of Reed Lane and South Street, which would make this project area immediately north of the Athen's study area. Leidemann makes no mention of the Athen's study in her report. Clark (1987:22) states the project areas are the same. As in the Athen's study, no undisturbed sand deposits were recorded and no traditional artifacts were found. The results of the analysis of the artifacts determined that the most likely time frame for the manufacture and disposal of the historic artifacts was between 1880 and 1930. Thus, this historic deposit was designated SIHP # -1973.

#### 3.2.1.5 Honolulu Iron Works

In 1985, five sets of human skeletal remains were documented at the Honolulu Iron Works construction site at the corner of Pohukaina and Punchbowl streets (Yent 1985). The burials were observed within pits in a sand deposit approximately 80 cm beneath the existing surface. The burials were designated SIHP # -2918 and were determined to be associated with Ka'ākaukui Cemetery, which was utilized from the 1700s to the early 1800s (McElroy et al. 2008).

#### 3.2.1.6 Nimitz Highway Reconstructed Sewer Project

In 2001, CSH conducted archaeological monitoring for the Nimitz Highway Reconstructed Sewer Project (Winieski and Hammatt 2001). The route of the sewer construction began on River Street, at the intersection of River and Hotel streets, ran to Nimitz Highway, and extended to Bethel Street, where it merged into the 'Ewa end of Queen Street. The route then extended along Queen Street to South Street, along South Street to Ala Moana Boulevard, and terminated at the Ala Moana Wastewater Pump Station. Only one historic property was encountered, a remnant of a light-gauge rail associated with the historic Honolulu Rapid Transit trolley system (SIHP # -5942) at the intersection of Queen Street and Nimitz Highway.

### 3.2.2 South Street to Cooke Street

#### 3.2.2.1 Kaka'ako Improvement District 3 and Pohulani Elderly Housing

In 1990, during construction of an elderly housing project at the southwest corner of Coral and Queen streets, human skeletal remains were uncovered and reported to the SHPD (Douglas 1991a). Eight burials were identified on the east side of the property; only five were removed (Winieski and Hammatt 2000). A glass bead was found with one burial, indicating a post-Contact date. One burial also exhibited an antemortem loss of the lower incisors, which suggests deliberate tooth evulsion, a procedure known to have been practiced by Hawaiians into the early post-Contact period (Ota and Kam 1982). This burial area was later designated SIHP # -4380. This project area is within the boundary of LCA 2045 to Kauwahi, who received the parcel in the time of Kamehameha I, indicating this was a Hawaiian habitation area as early as the beginning of the nineteenth century.

In 1991, during excavation of a water line trench between Coral and Queen streets across Mother Waldron Park (SIHP # -1388), human skeletal remains were discovered and disinterred (Douglas 1991b). The remains were determined to be of Hawaiian ancestry, with a possibly associated pig burial. These burials were considered part of SIHP # -4380.

Between November 1990 and September 1992, CSH (Winieski and Hammatt 2000) monitored construction within Kaka'ako ID-3, the Pohulani Elderly Rental Housing project area and the Kauhale Kaka'ako project area (TMKs: [1] 2-1-030, 031, 032, 044, 046, 047, 048, 050, 051, 052, 054). Kaka'ako Improvement District 3 is bounded by Kapi'olani and King streets (north), the

northern end of Cooke Street (east), Halekauwila Street (south), and South Street (west). It includes extensions of Keawe and Cooke streets to the south.

The monitoring of subsurface excavations revealed that, although the area had been previously disturbed to a significant extent, a cultural layer and naturally deposited Jaucas sand and volcanic cinder deposits are still intact below fill layers. The cultural layer contained historic artifacts mixed with sparse traditional Hawaiian cultural materials. Twenty human burials were discovered during these projects, nine at the Pohulani Elderly Rental Housing project (SIHP # -4380) and 11 in and around Mother Waldron Park (SIHP # -5820). Five burials were in an extended position, seven were flexed, and eight could not be determined. One burial was in a coffin and one contained a glass trade bead, indicating they were of post-Contact age. Seventeen of these burials were disinterred and subsequently reinterred in the northeast corner of Mother Waldron Park. Three were left in place beneath the Pohulani Elderly Rental Housing Facility. These burials are all clustered around the location of LCA 982 to Kukao and the Pu‘unui parcel to Queen Emma, an area shown as indicating a cluster of Hawaiian house lots shown on several late nineteenth century maps (Winieski and Hammatt 2000).

In 1998, an archaeological assessment for a 6.8-acre land parcel was conducted by CSH (Hammatt and Chiogioji 1998). The parcel is bounded by Halekauwila Street (north), Pohukaina Street (south), Keawe Street (west), and Cooke Street (east). The parcel is the site of a municipal parking lot, a state government building, Mother Waldron Playground, and a lawn area. It is also the former site of the Pohukaina Elementary School. The Mother Waldron Park area was designated SIHP # -1388 as part of a thematic group of Honolulu City and County Art Deco Parks. A reinterment site for the Hawaiian burials discovered during construction within Kaka‘ako ID-3 (Winieski and Hammatt 2000) is located at the corner of Cooke and Halekauwila streets. SHPD also designated an interment site at the corner of Cooke and Pohukaina streets, which “will be reserved for future interments” (SHPD memo of 2 July 1992, cited in Hammatt and Chiogioji 1998:29).

#### 3.2.2.2 Halekauwila Street Properties–Pohukaina School

In 2009, preliminary subsurface backhoe testing was conducted at three parcels owned by Kamehameha Schools between Halekauwila and Auahi streets in the western *mauka* section of the Kaka‘ako Development District (O’Hare et al. 2009). Thirteen trenches were excavated in open/parking areas of the parcel. A sandy clay/clay loam layer (Stratum II), the former ground surface during the pre-Contact/early post-Contact periods, was recorded in six of the test trenches but not assigned a site number.

In 2009, CSH archaeologists excavated 16 trenches in the Halekauwila Place property, once the grounds of Pohukaina School (Tulchin et al. 2009). Subsurface testing revealed several historic and modern fill layers overlying natural sediments. The natural sandy clay sediments were typical of a wet, marsh-type environment. Fill layers overlying the natural sediments included a layer of ash and burnt garbage, interpreted as fill material generated by the city’s municipal garbage incinerator, and layers of sandy clay, interpreted as fill material generated by the dredging of Honolulu Harbor and other coastal areas in the vicinity. The presence of the dredge fill material and incinerator fill material is consistent with background research of Kaka‘ako land reclamation projects dating to the late 1800s and early 1900s. The upper terrigenous fill layers included construction debris and abandoned utilities, evidence of the former Pohukaina School. Numerous historic artifacts, mainly glass bottles and ceramics, were recovered from the fill layers; most were

dated to the late nineteenth to early twentieth century. No pre-Contact cultural layers, artifacts or burials were found.

#### 3.2.2.3 Block 2 Parking Lot

In 2010, CSH conducted an archaeological inventory survey of Kamehameha Schools Block 2 Parking Lot (Pammer et al. 2011). This AIS work included excavation of 72 trenches; five trenches were previously excavated within the project area (see Figure 34). CSH identified four subsurface historic properties. These were two historic-era layers (SIHP #s -7124 and -7189), salt-pan deposits (SIHP # -7190) and a late pre-Contact/early historic cultural layer (SIHP # -7197). No human skeletal remains or burials were identified (Pammer et al. 2011).

#### 3.2.2.4 Former Comp USA Parcel

In 2010, CSH conducted an archaeological inventory survey (19 trenches) in the former Comp USA parcel property, located immediately southwest of the current project area (Pammer and Hammatt 2010). No historic properties were identified. Observed stratigraphy consisted of varying fill layers deposited atop a thin layer of marine clay atop the coral shelf. Test excavations indicated the subject parcel formerly consisted of tidal flats periodically inundated with seawater prior to being filled in during historic land reclamation.

#### 3.2.2.5 Kamehameha Schools Block F

In 2012, archaeological monitoring associated with the 680 Ala Moana Renovation Project was conducted just south of the current project area (Medina and Hammatt 2013). Ground disturbance associated with this project involved open trenching for utility installations and a grease interceptor. Observed stratigraphy consisted predominantly of imported fill associated with historic land reclamation. Jaucas sands were observed beneath approximately 1.5 m of fill in several portions of the study area. One previously identified historic property was observed, (SIHP # -7413, Features B and C). Feature B consisted of buried concrete slabs that corresponded to historic building footprints based on historic fire insurance maps spanning from 1927 to 1955. Feature C consisted of subsurface trash layers associated with land reclamation.

In 2013, CSH completed an archaeological inventory survey of Kamehameha Schools Kaka'ako Block F, located immediately south of the current project area (Tulchin and Hammatt 2013). This AIS work included the excavation of 20 trenches. Two subsurface historic properties were identified, SIHP # -7412, a discontinuous subsurface cultural layer containing post-Contact western-introduced cultural material including crushed red brick, cut faunal bone, glass fragments, slag, and metal fragments; and SIHP # -7413, surface and subsurface features predominantly associated with the property's development and utilization as a Hawaiian Sugar Planters Immigration Station (i.e., a reinforced concrete building, buried concrete structural remnants, and subsurface trash layers).

#### 3.2.2.6 Kamehameha Schools Block B

In 2009, CSH completed an archaeological inventory survey plan (AISP) for three Kamehameha Schools Kaka'ako parcels, including Block B (O'Hare et al. 2009). This AISP included a subsurface testing component to provide information about the study area's stratigraphy in order to better develop a predictive model for the project area, which would in turn help fine tune the subsurface testing strategy. This preliminarily phase of subsurface testing revealed that stratigraphy within the study area generally consisted of imported fill overlying naturally deposited marine clay. The imported fill predominantly consisted of crushed coral. In some cases naturally

deposited sediment was not present. Of note was the presence of a historic trash layer within every test excavation. This trash layer was present either atop naturally deposited sediment or directly atop the coral shelf. Historic artifacts within the trash layer consisted of glass bottles and ceramics dating from the late nineteenth to the early twentieth century.

#### 3.2.2.7 Ilalo Street

In 2008, Garcia and Associates completed an archaeological assessment of a 4-acre parcel bounded by Ala Moana Boulevard, Cooke Street, Ilalo Street, and Keawe Street (McElroy et al. 2008). Stratigraphic information from test excavations indicated the study area consisted of former reef flats filled in during the early 1900s. Observed sediments consisted of modern fill deposits over submerged, gleyed, clayey silt. No significant cultural resources were identified.

### 3.2.3 Honolulu High-Capacity Transit Corridor Project (Punchbowl Street to Ward Avenue)

In 2013, CSH completed an archaeological inventory survey for the City Center portion of the Honolulu High-Capacity Transit Corridor Project (HHCTCP) (Hammatt 2013), a study area extending from Middle Street to Ala Moana Center. Subsurface investigations identified six previously identified historic properties in the Kaka‘ako area from Punchbowl Street to Ward Avenue: SIHP #s -2819, -2963, -5820, -7124, -7189, and -7190.

SIHP # -2819 is a previously identified subsurface cultural deposit consisting of a culturally enriched sandy loam A horizon, exhibiting both pre- and post-Contact land usage. This historic property was first identified in 1985 by Martha Yent of State Parks as consisting of six burials located at the former Honolulu Ironworks site during construction of Restaurant Row (Yent 1985). Hammatt (2013) expanded the boundaries of the site and identified 30 additional features. Twenty-six features were associated with the culturally enriched A horizon and consisted of one human burial pit, one dog burial pit, three postmolds, and 21 indeterminate pits. The four additional features consisted of two indeterminate pits, an infilled pit containing historic structural remains, and a postmold containing a preserved post.

SIHP # -2963 is a subsurface cultural deposit consisting of a buried, culturally enriched A horizon with 39 associated features, pond sediments, and eight other archaeological features associated with other fills or natural strata. Collectively the 39 features consist of 16 pits, six trash pits, five animal burials, four human burials, four possible postmolds, two isolated animal bone areas, one burned soil area, and one posthole. Twenty-seven of the features were previously identified by Clark (1987) and 12 by Hammatt (2013). Pond sediments were identified by both Clark (1987) and Hammatt (2013). The other eight archaeological features were identified by Clark (1987), and consist of a large pit, a cement building foundation, a red brick layer or possible building foundation within parking lot fill, a buried land surface within marine sand, and three human burials with no associated burial pits or strata. A total of 13 human burials are associated with SIHP # -2963, of which six were identified by Ota and Kam (1982) and seven were identified by Clark (1987).

SIHP # -5820 consists of two buried, culturally enriched layers. The lower cultural layer is an in situ culturally enriched A horizon. The upper cultural layer consisted of redeposited culturally enriched fill, and was likely a reworked former A horizon. It was separated from the lower cultural layer by an approximately 20 to 50 cm thick fill deposit. Hammatt (2013) identified 31 archaeological features and Winieski and Hammatt (2000) identified 11 burials. Of the 31 identified features, 19 were associated with the lower, culturally enriched A horizon and include

one *imu* pit and 18 indeterminate pits. Eight features were identified within the upper cultural layer and include one pit containing two dog burials, one possible postmold, and six indeterminate pits. Three additional features that were truncated by fill material postdating the buried A horizon were considered to be part of SIHP # -5820 based on proximity. They include one horse burial pit with disarticulated and scattered human remains, and two indeterminate pits. Also identified by Hammatt (2013) was a traditional Hawaiian burial within the Jaucas sand that predated the lower buried A horizon.

SIHP # -7124 consists of buried in situ and displaced historic infrastructure remnants, demolition debris, and refuse-enriched fill deposits initially identified by Pammer et al. (2011), the limits of which were expanded by Hammatt (2013).

SIHP # -7189 is a subsurface burnt trash deposit containing glass bottles, ceramics, metal, and cut faunal bone. The site was originally identified by Pammer et al. (2011) and its boundaries were expanded by Hammatt (2013). Historic artifacts collected from SIHP # -7189 date from the late 1800s to early 1900s. The burnt trash within SIHP # -7189 was indicated to be associated with open-air trash burning that occurred during the late nineteenth to early twentieth century. The subsurface burnt trash layer was determined to be deposited in the early twentieth century (ca. 1920s to 1930s) when low-lying areas in Kaka‘ako were infilled to advance urban development (Hammatt 2013).

SIHP # -7190 consists of subsurface salt pan remnants originally identified by Pammer et al. (2011), the limits of which were expanded by Hammatt (2013). The salt pan remnants include alternating layers of clay and organic peat and one sandy clay berm. SIHP # -7190 was identified at depths ranging from 1.3 m to 1.65 m below the surface during the Pammer et al. (2011) study and between 0.78 m and 1.37 m during the Hammatt (2013) study. Multiple fill strata were observed overlying the salt pan remnants including burnt trash fill (SIHP # -7189) and hydraulic fill strata associated with historic land reclamation as well as urban development.

### **3.3 Background Summary and Predictive Model**

From the pre-Contact period into the early 1900s, Kaka‘ako was considered separate from the two main population centers of the region, Honolulu and Waikīkī. It was sparsely populated and characterized by a relatively barren plain dotted with fishponds and salt pans. In general, Kaka‘ako was not a favored location of permanent habitation or traditional agricultural activities.

Land Commission documents indicate these lands were largely given to the *ali‘i* as fort lands to support the soldiers in Honolulu and to commoners who claimed small house lots adjacent to fish or salt ponds. From the late 1800s into the early 1900s, Kaka‘ako was used as a place for cemeteries and quarantine of medical patients; then became an area for dumping sewage and burning garbage; and finally an area used for cheap housing and commercial purposes.

Previous archaeology indicates much of the sediments in the area are fills, some of which extend to the water table. Subsurface cultural deposits identified in the vicinity of the project area consist of post-Contact deposits associated with salt production, trash disposal, and urban/industrial development. Elsewhere, some natural sediments remain intact below the fill layers, including sections with Jaucas sands; this is important since sand dunes or berms were favored locations for traditional Hawaiian burial. Small clusters of traditional Hawaiian burials have been recorded in this area (e.g., SIHP # -2963). In addition, more than 200 burials have been recorded in the Kaka‘ako area from Punchbowl to Cooke Street, and from King to Pohukaina Street mostly in two

large historic cemeteries (see Figure 35). These include 116 burials from Kawaiaha‘o Cemetery (SIHP # -4534), used from as early as ca. 1825 to present, and 87 burials from Honuakaha Cemetery (SIHP # - 3712), used from 1853-1854 for smallpox victims.

The current project area is situated just *mauka* of the pre-1850 coastline. The project area is located within LCA 7713 (the *‘ili* of Ka‘ākaukukui) which was awarded to Victoria Kamāmalu, the sister of Kamehameha IV and Kamehameha V. However, based on present research, no individual *kuleana* were awarded within this portion of LCA 7713. Thus there are no *kuleana* related testimonies to provide insight into traditional Hawaiian land use during the mid-nineteenth century. Historic maps indicate post-Contact salt production was occurring near the project area, but not within it. Of note are indications of traditional Hawaiian settlement within and in the immediate vicinity of the project area, as shown on maps spanning from the early to mid-1800s. Historic accounts indicate the project area was completely filled by 1914. Thus background research suggests a high probability of encountering Jaucas sand and/or pre- and/or early post-Contact cultural deposits capped beneath historic and modern fill. Pre- and/or early post-Contact cultural deposits within the project area may include clearly defined cultural layers, midden, traditional Hawaiian artifacts, pit features, and human burials.

Additionally, historic fire insurance maps (1914 to 1956) and aerial photographs (1927 and 1952) indicate a high potential for encountering post-Contact cultural deposits associated with early to mid-twentieth century habitation and commercial activities (e.g. Union Feed Company, Ltd.). Thus, the potential exists to encounter cultural layers, trash pits, incinerator layers, privies, and/or buried structural foundations dating to the first half of the twentieth century.

## Section 4 Results of Fieldwork

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### 4.1 Pedestrian Inspection

As discussed in the Methods Section, a 100% pedestrian inspection of the project area's surface confirmed there were no surface archaeological historic properties present. However, an architectural inventory survey of the project area has established that most of the standing architecture within the project area is over 50 years old (Mason Architects, Inc. 2009). The architectural inventory survey stated the historic buildings within the current project area "Lacks significance associated with architectural distinction. No known association with a significant person or event. Lacks integrity due to significant alteration. Evaluated ineligible both individually or as part of a district for nomination to the National Register of Historic Places" (Mason Architects, Inc. 2009).

### 4.2 Subsurface Testing

#### 4.2.1 Summary

This summary provides an overview of the subsurface testing results. For detailed information regarding each of the test excavations, please refer to the stratigraphic profiles, sediment descriptions, and photographs that follow (Section 4.2.2 Test Excavation Documentation).

The subsurface testing program initially consisted of 46 machine-assisted test excavations, each measuring 6 m long by 0.8 m wide, for a total surface excavation of approximately 221 sq m (Figure 36). However, upon identifying burial finds in Test Excavations 25 and 40 an additional 195 sq m was excavated in order to better delineate the horizontal extent of subsurface cultural deposits. This expansion of subsurface testing consisted of the excavation of 15 additional test excavations of varying size, increasing the total surface area of excavation to 416 sq m or approximately 3.0% of the total project area.

Six historic properties were identified during subsurface testing, including a twentieth century cultural layer (SIHP # -7578); a twentieth century fill layer and associated building foundations (SIHP # -7579); a pre- to post-Contact cultural layer with a historic burial cluster (SIHP # -7580); a pre-Contact traditional Hawaiian bundle burial (SIHP # -7581); and two sets of disarticulated human skeletal remains within non-burial contexts (SIHP #s -7582 and -7583) (see Figure 36).

Observed stratigraphy from open trenching indicates the project area had been subjected to intensive land reclamation via in-filling of low-lying areas. Fill material associated with land reclamation consisted primarily of crushed coral with smaller amounts of dredged marine clay. This fill material is consistent with material known to have been utilized during large scale land reclamation projects within the Kaka'ako area, with the sand and ground-up coral (i.e., crushed coral) originating from dredging activities associated with the expansion of Honolulu Harbor and other various marine development (Hawaii Department of Public Works 1914; Hawaii Supreme Court 1915). Historic accounts indicate that the vicinity of the project area was filled by 1914.

The fill deposits observed in the project area represent cultural deposits that have the potential to be tied to geographically broad land reclamation events which have significantly altered the

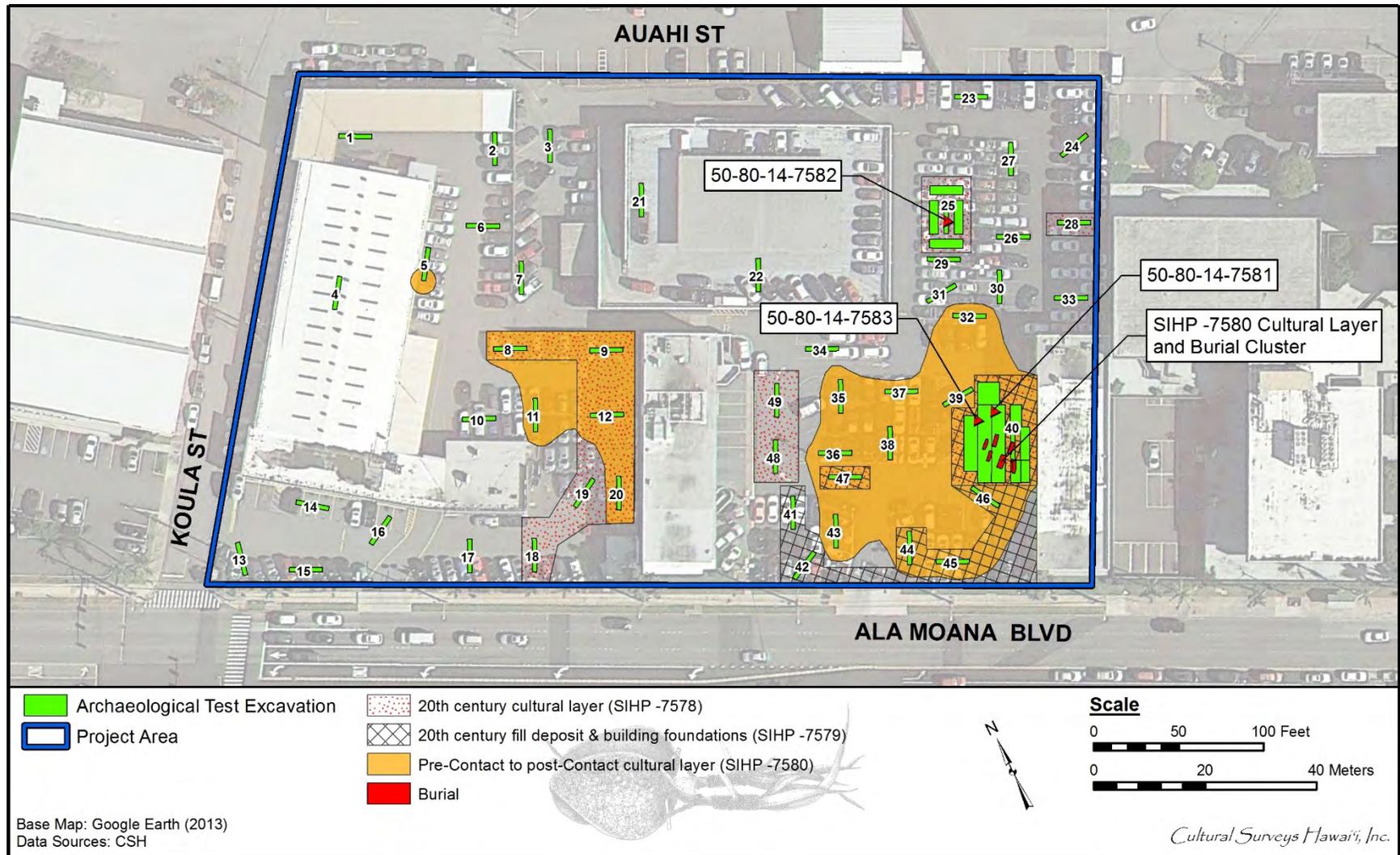


Figure 36. Location of test excavations and historic properties within the project area

natural landscape. They also have the potential to address research questions about the historic urbanization of the Kaka'ako area, not answerable by historic accounts.

Observed naturally deposited sediments capped beneath historic land reclamation fill prompted the designation of three stratigraphic zones within the project area (Figure 37 and Table 5). Each of the three stratigraphic zones coincides with discrete land forms and/or environmental zones that would have been present prior to historic in-filling and other various land alterations associated with urbanization (i.e., stream channeling, etc.). An analysis of depth below the existing surface for each stratigraphic zone was undertaken in an attempt to recreate the topography of the pre-development land surface within the project area. This was accomplished in two ways. The first involved the creation of stratigraphic cross-sections of the project area through an analysis of test excavation profiles and an interpolation of their stratigraphic data (Figure 38, Figure 39, and Figure 40). The second consisted of a topographic map generated in ArcGIS utilizing measurements of natural sediments below the existing surface at each test excavation, which were then used to generate interpolated topographic contours throughout the project area (Figure 41).

#### 4.2.1.1 Stratigraphic Zone 1

Stratigraphic Zone 1 consists of the Diamond Head-*makai* portion of the project area (see Figure 37). Stratigraphic Zone 1 represents a coastal sand dune that would have been a land surface elevated above the shoreline and surrounding semi-marine environment (tidal flats, coastal lagoons, etc.) prior to historic land reclamation and subsequent modern development. The stratigraphic sequence within this zone consists of: 1.) imported fill sediments associated with modern development; 2.) imported fill sediments associated with historic land reclamation; 3.) imported fill associated with the Union Feed Company; 4.) a buried A horizon that formed atop naturally deposited Jaucas sand; and 4.) naturally deposited marine clays underlying the Jaucas sand that developed atop the coral shelf (i.e., limestone bedrock).

The modern fill consists of asphalt, base courses, and imported sediments containing construction debris and in-filled utility trenches and pits.

The historic fill consists predominantly of crushed coral and marine clay dredge utilized to fill in low-lying areas during historic land reclamation efforts. In certain locations an A-horizon (SIHP # -7578) developed atop these land reclamation sediments. This A-horizon was enriched with historic cultural material and contained subsurface pit features (trash pits, postmolds, fire pit, and a horse burial). In other locations a crushed coral pavement (SIHP # -7578, Feature P) was constructed atop the land reclamation sediments. These components (the culturally enriched A-horizon, the coral pavement, and the subsurface pit features) have been designated as SIHP # 50-80-14-7578.

The imported fill (SIHP # -7579) associated with the Union Feed Company consists of a small-scale localized fill event limited to the southern quadrant of the project area. This fill sediment is completely different in color and texture from the large-scale land reclamation sediments, and it contained historic artifacts dating predominantly from the mid- to late- nineteenth century. Fifteen concrete building foundations (SIHP # -7579, Features A-O) were intrusive through the fill layer. The distribution of this layer and the associated building foundations appears to correspond to the limits of the Union Feed Company stable

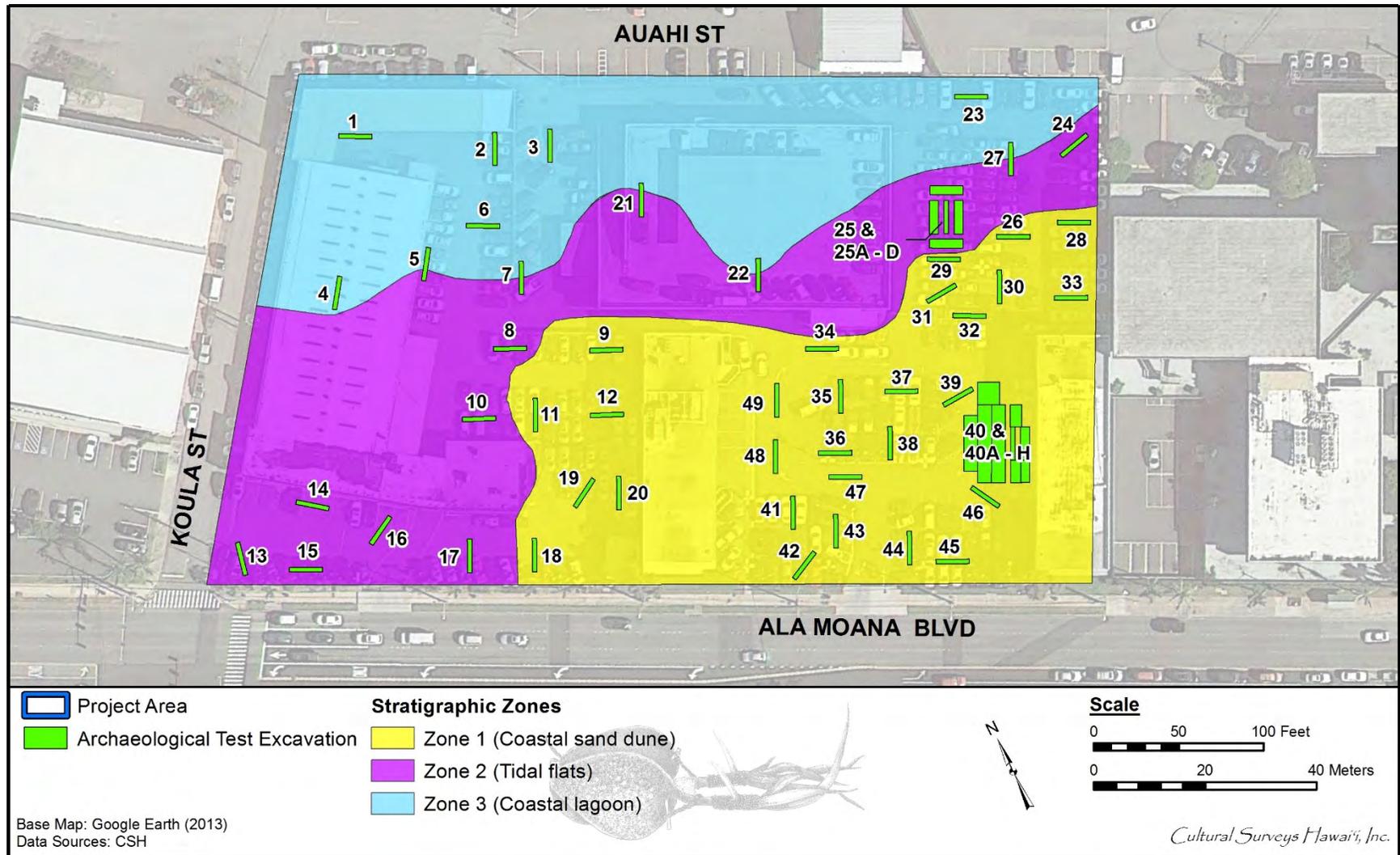


Figure 37. Location of test excavation and stratigraphic zones present within the project area

Table 5. Test Excavations Broken into Stratigraphic Zones

<b>Stratigraphic Zone</b>	<b>Test Excavation</b>
Zone 1 (Coastal sand dune)	9, 11, 12, 18, 19, 20, 26, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 40A, 40B, 40C, 40D, 40E, 40F, 40G, 40H, 41, 42, 43, 44, 45, 46, 47, 48, 49
Zone 2 (Tidal flats)	5, 7, 8, 10, 13, 14, 15, 16, 17, 21, 22, 25, 25A, 25B, 25C, 25D, 27, 24
Zone 3 (Coastal lagoon)	1, 2, 3, 4, 5, 6, 7, 21, 22, 23, 27

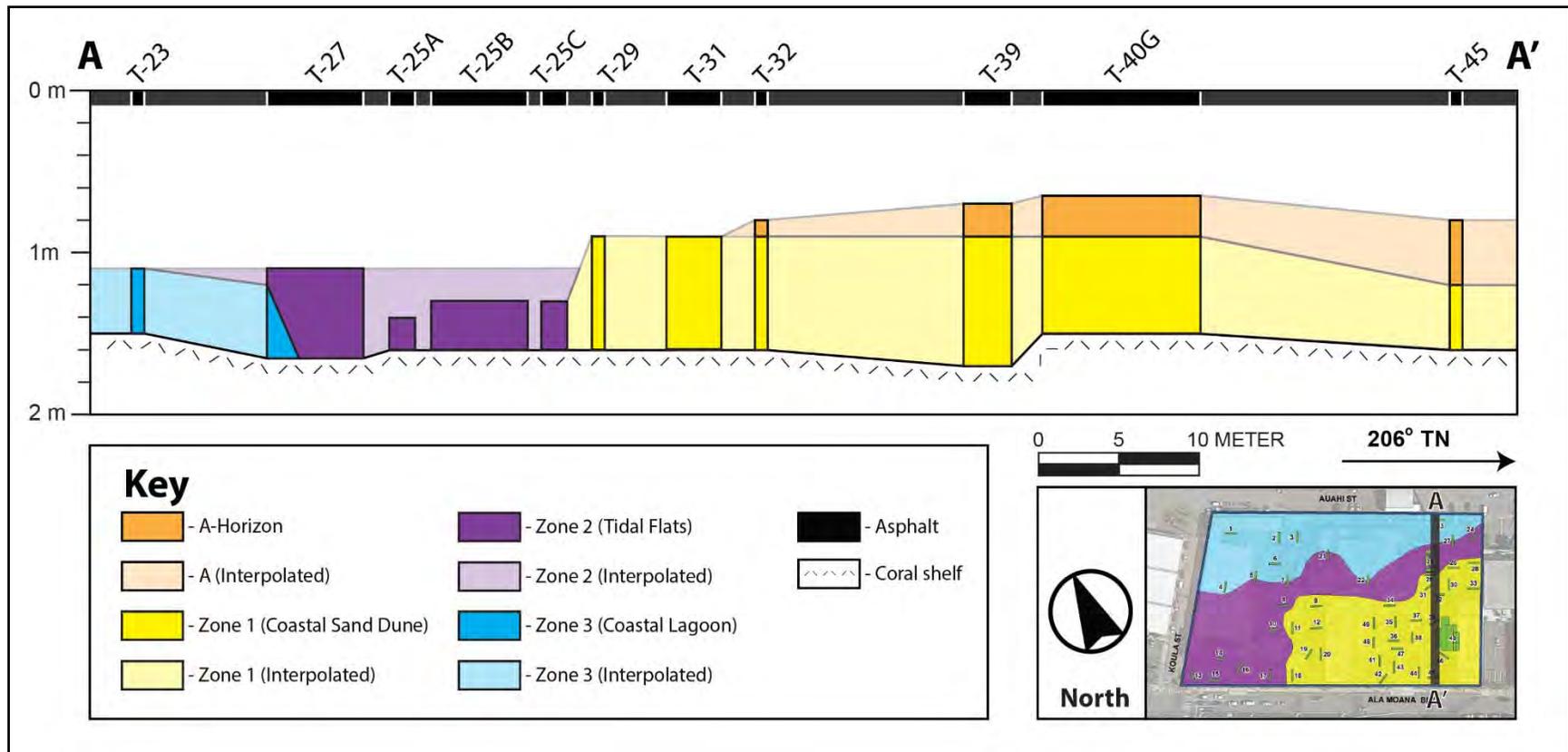


Figure 38. Stratigraphic cross section (A to A') of naturally deposited sediments beneath the existing asphalt surface within the project area

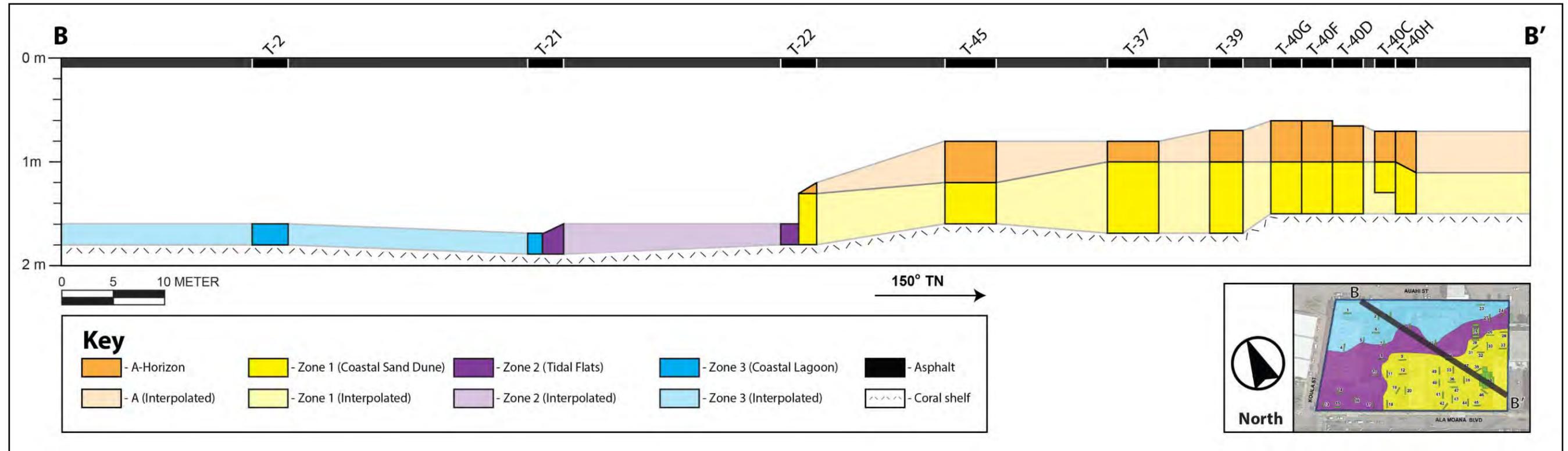


Figure 39. Stratigraphic cross section (B to B') of naturally deposited sediments (i.e., former land surface) present beneath the existing surface within the project area

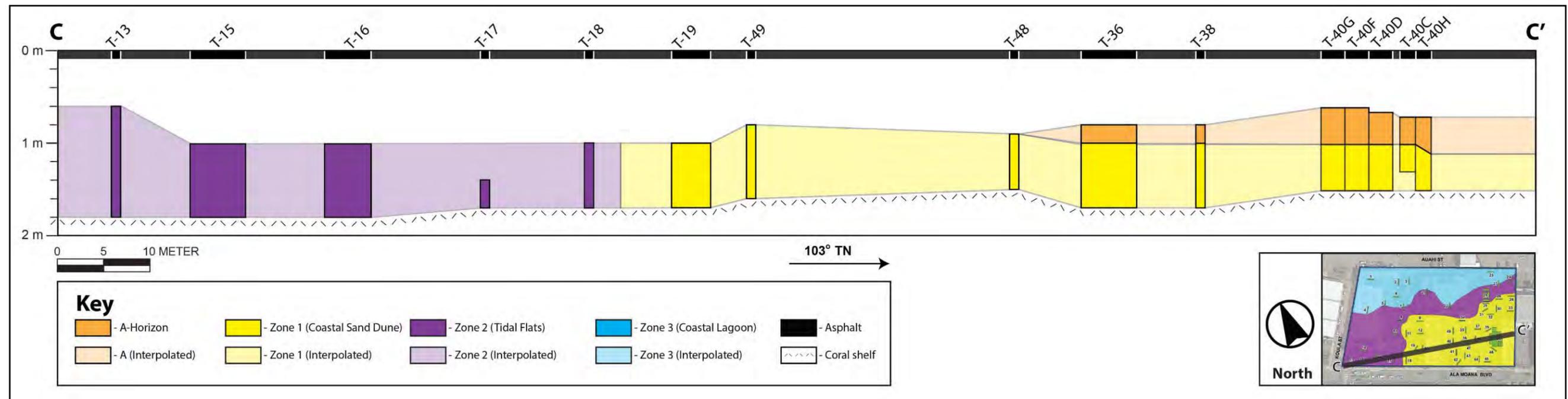


Figure 40. Stratigraphic cross section (C to C') of naturally deposited sediments (i.e., former land surface) present beneath the existing surface within the project area

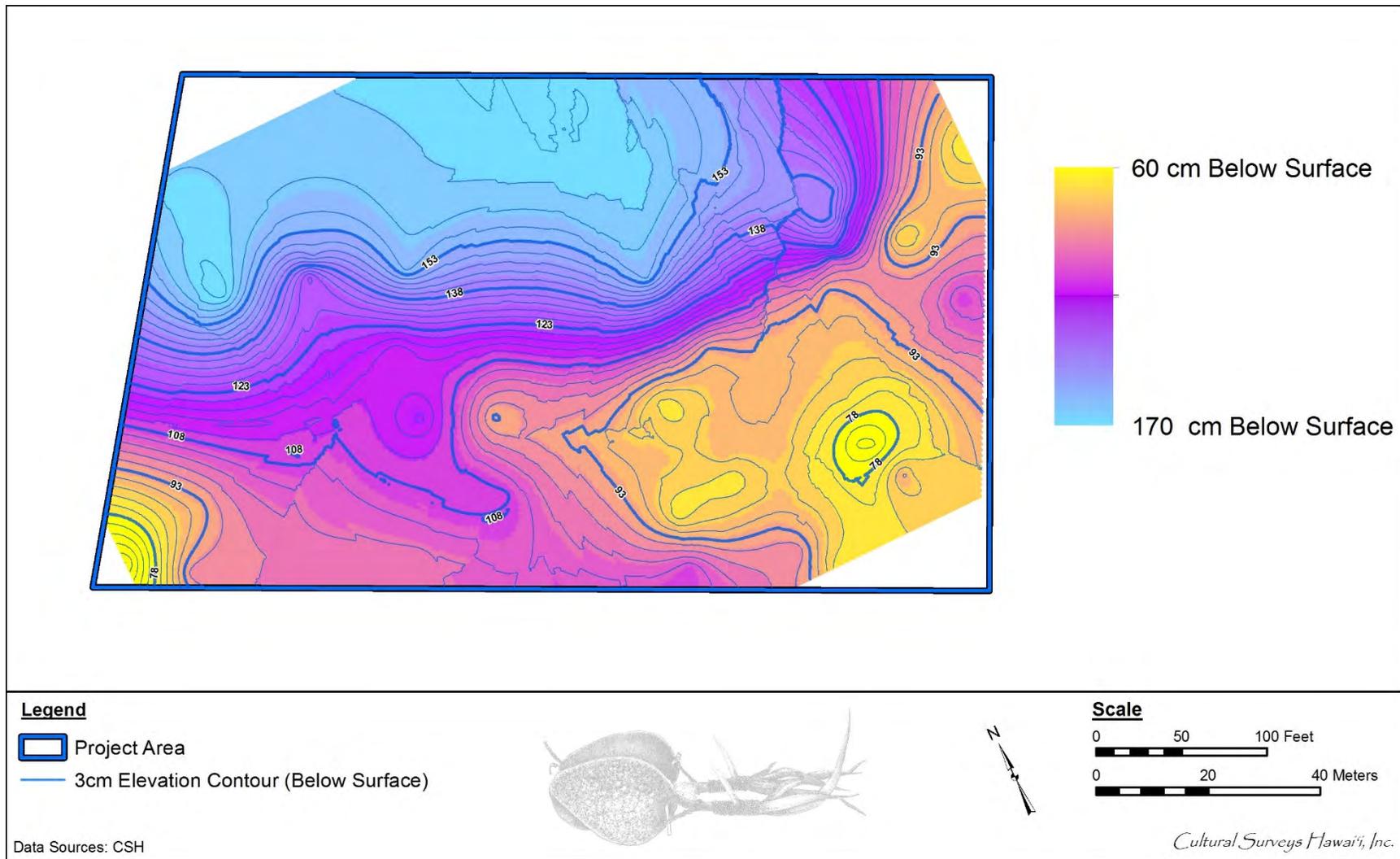


Figure 41. Topographic map showing the depth of naturally deposited sediments across the project area

depicted on a 1914 fire insurance map (see Figure 30). Based on historic maps it is believed that the fill layer and the building foundations are related to the Union Feed Company which was established within the project area by 1900 (see Section 4.3.2 Historic Property Description). The fill deposit and the building foundations have been designated as components of SIHP # 50-80-14-7579.

The remaining stratigraphic sequence within Zone 1 consists of a buried A-horizon developed atop Jaucas sand, with naturally deposited marine clays that developed atop the coral shelf (i.e., limestone bedrock) underlying the Jaucas sand. Of note is the buried A-horizon, as portions of it have been enriched with both traditional Hawaiian and imported historic cultural material, as well as subsurface pit features and a cluster of historic coffin burials. The culturally enriched portions of this A horizon have been designated as SIHP # 50-80-14-7580.

#### 4.2.1.2 Stratigraphic Zone 2

Stratigraphic Zone 2 runs along the *mauka* edge of Stratigraphic Zone 1 and fans out at the 'Ewa-*makai* corner of the project area (see Figure 37). The stratigraphic sequence within this zone consists of imported fill sediments (both modern and historic) atop naturally deposited sandy clay that formed atop the coral shelf (i.e., reef flat related to higher stand of the sea). Stratigraphic Zone 2 represents tidal flats that formed behind the sand dune (Stratigraphic Zone 1) and extended west ('Ewa) along the coast. As this stratigraphic zone represents a semi-marine environment (i.e., tidal flats) prior to historic land reclamation, it is not surprising that traditional Hawaiian cultural deposits are basically nonexistent (with cultural deposits observed at TE 5 being an anomaly). Of note is the expansion of SIHP # -7578 (twentieth century cultural layer) into this zone. The presence of SIHP # -7578 illustrates a dramatic shift within the project area and Kaka'ako in general, where the natural landscape was completely redesigned (via land reclamation activities) to spur the expansion of urban Honolulu. Areas once uninhabitable because of tidal fluctuations were now dry, allowing human settlement to expand beyond former limitations.

#### 4.2.1.3 Stratigraphic Zone 3

Stratigraphic Zone 3 consists of the *mauka* third of the project area (see Figure 37). The stratigraphic sequence within this zone consists of imported fill sediments (both modern and historic) atop naturally deposited marine clay that formed atop the coral shelf (i.e., limestone bedrock). The naturally deposited sediments observed in this zone consisted of anaerobic soils that developed while being completely waterlogged, suggesting Stratigraphic Zone 3 represents a coastal lagoon environment formed behind the sand dune (Stratigraphic Zone 1). Prior to historic land reclamation, this zone would have been completely inundated with shallow slow moving water, thus, the complete absence of traditional Hawaiian cultural deposits. Nineteenth and twentieth century cultural deposits observed elsewhere in the project area were similarly not identified. This absence is attributed to disturbances (i.e., mass excavations) associated with existing building construction and associated infrastructure observed within this zone.

## 4.2.2 Test Excavation Documentation

### 4.2.2.1 Test Excavation 1

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 1 (TE 1) (Table 6, Figure 42, and Figure 43) consists of imported fill (Stratum I) overlying naturally deposited marine clay (Stratum II). Stratum Ia consists of imported fill material associated with the construction of the existing asphalt surface. Stratum Ib consists of historic land reclamation fill containing crushed coral and concrete construction rubble. Stratum II consists of anaerobic soils that developed while completely waterlogged and suggests the immediate area consisted of a coastal lagoon environment (Zone 3) prior to land reclamation. Excavation of TE 1 ceased at at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 6. Strata Observed at Test Excavation 1

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with the construction of the existing asphalt surface.
Ib	20-160	10YR 4/2, dark grayish brown; very cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; historic fill; consists of imported crushed coral and 50% concrete construction rubble
II	160-180	Gley 1 7/5GY, light greenish gray; clay; structureless massive; wet sticky consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation, Zone 3.

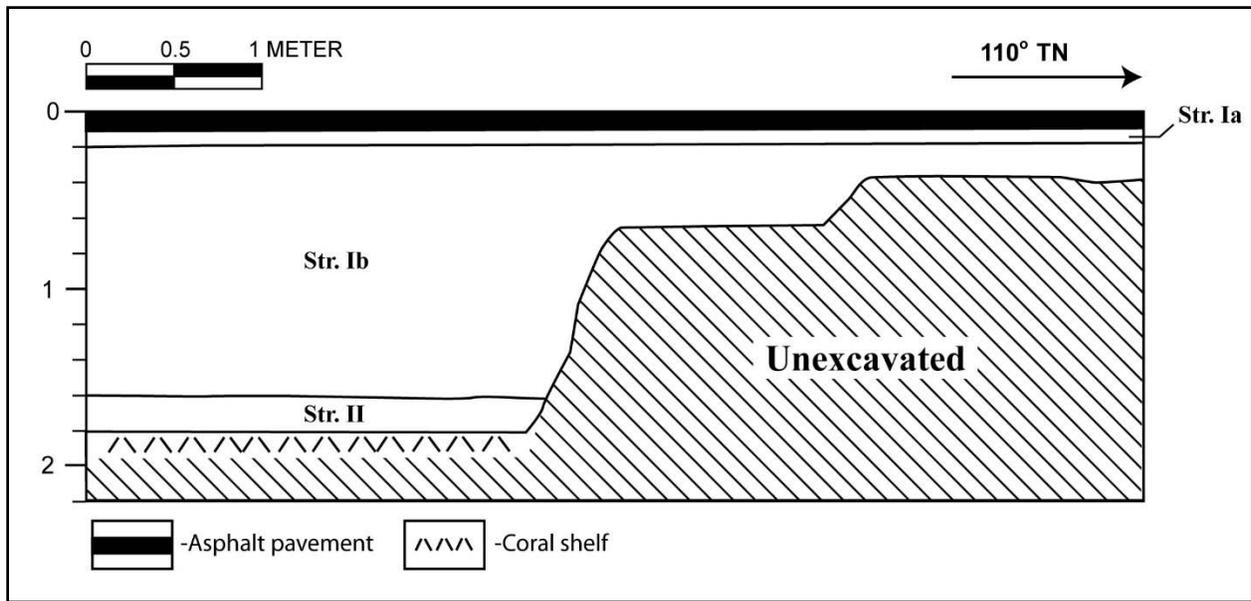


Figure 42. TE 1, stratigraphic profile of north sidewall



Figure 43. TE 1, photograph of north sidewall

## 4.2.2.2 Test Excavation 2

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 2 (TE 2) (Table 7, Figure 44, and Figure 45) consists of imported fill (Stratum I and Stratum II) overlying naturally deposited sandy clay. Stratum I (Ia-Ib) consists of imported fill material utilized for the construction of the existing asphalt surface. Stratum II consists of imported crushed coral fill utilized for historic land reclamation. Stratum III consists of anaerobic soils that developed while completely waterlogged, suggesting the immediate area consisted of a coastal lagoon environment (Zone 3) prior to land reclamation. Excavation of TE 2 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 7. Strata Observed at Test Excavation 2

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported crushed coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-50	7.5YR 2.5/3, very dark brown; clay loam; moderate, fine, blocky structure; moist firm consistency; slightly plastic; terrigenous origin; very abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-160	10YR4/1, dark gray; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral fill containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	160-180	GLE Y 1 6/N, gray; sandy clay; structureless massive; moist firm consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation, Zone 3.

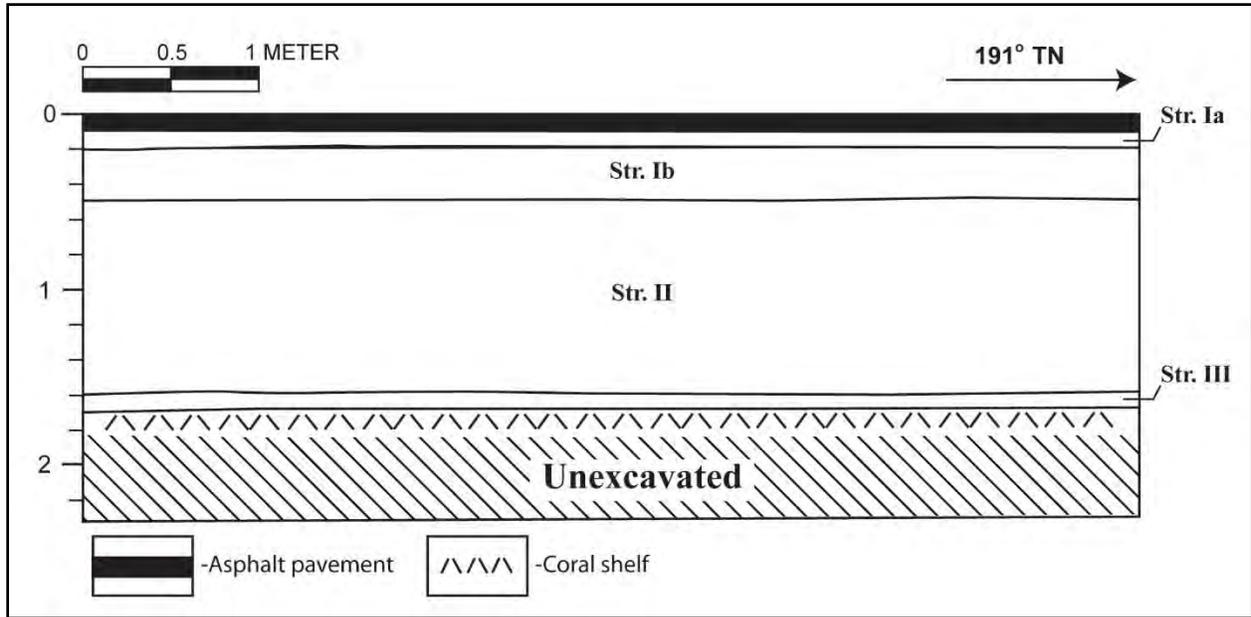


Figure 44. TE 2, stratigraphic profile of east sidewall



Figure 45. TE 2, photograph of east sidewall, view to east

## 4.2.2.3 Test Excavation 3

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.4 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 3 (TE 3) (Table 8, Figure 46, and Figure 47) consists of imported fill (Stratum I and Stratum II) deposited directly on top of the limestone bedrock (i.e., coral shelf). Stratum I consists of imported fill utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Excavation of TE 3 ceased at 1.4 m upon encountering the coral shelf (i.e., limestone bedrock).

Table 8. Strata Observed at Test Excavation 3

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
I	10-20	10YR 8/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	20-40	10YR 8/2, very pale brown; very cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIb	40-140	10YR3/3, dark brown; very gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; imported mixture of crushed coral and volcanic cinder fill. This stratum is associated with historic land reclamation.

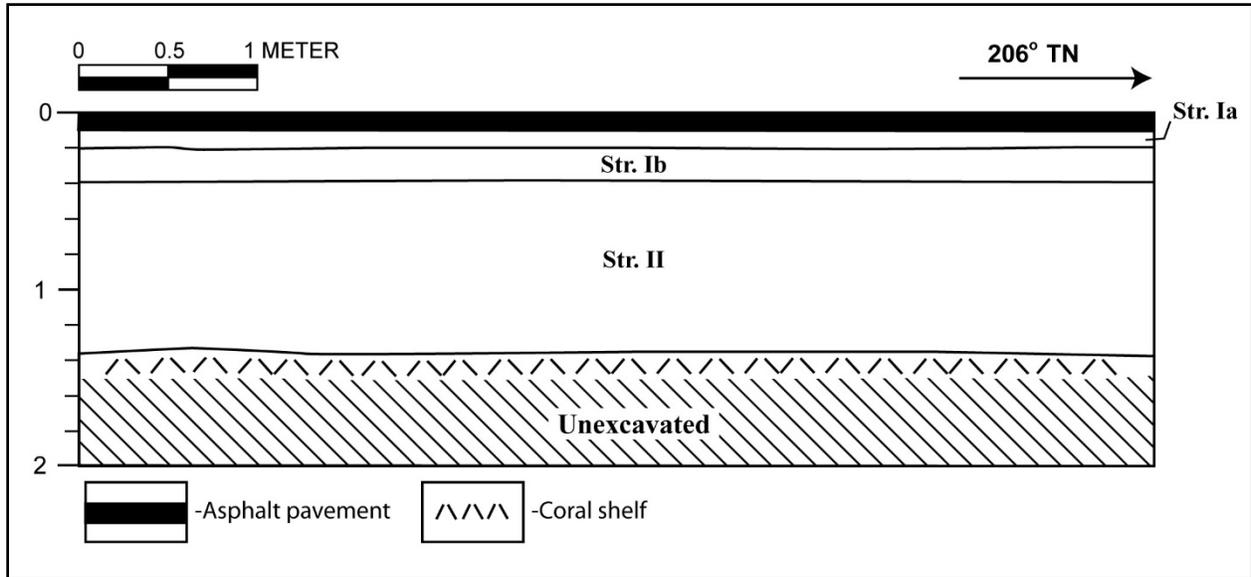


Figure 46. TE 3, stratigraphic profile of southeast sidewall



Figure 47. TE 3, photograph of southeast sidewall

## 4.2.2.4 Test Excavation 4

<b>Length:</b>	6 m
<b>Width:</b>	0.6 m
<b>Maximum Depth:</b>	1.9 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 4 (TE 4) (Table 9, Figure 48, and Figure 49) consists of imported fill (Stratum I) overlying naturally deposited sandy clay. Stratum Ia consists of imported fill material utilized for construction of the existing concrete surface. Stratum Ib likely consisted of crushed coral fill utilized for historic land reclamation, but has been repurposed during existing building construction (i.e., mass excavation and backfilling due to subsurface hydraulic lift installation). Stratum II consists of anaerobic soils that developed while completely inundated, suggesting the immediate area consisted of a coastal lagoon environment (Zone 3) prior to land reclamation (Zone 3). Excavation of TE 4 ceased at 1.9 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 9. Strata Observed at Test Excavation 4

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Concrete
Ia	10-60	5 YR 3/4, dark reddish brown; clay loam; weak, medium, blocky structure; moist, firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported fill associated with existing building construction
Ib	60-170	10 YR 6/1, gray; very gravelly loam; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; clear lower boundary; smooth topography; land reclamation sediment repurposed for building construction (i.e., mass excavation for subsurface hydraulic lift system)
II	170-190	GLE Y 2 6/10B, bluish gray; sandy clay; structureless, massive; wet, sticky consistency; plastic; marine origin. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation, Zone 3.

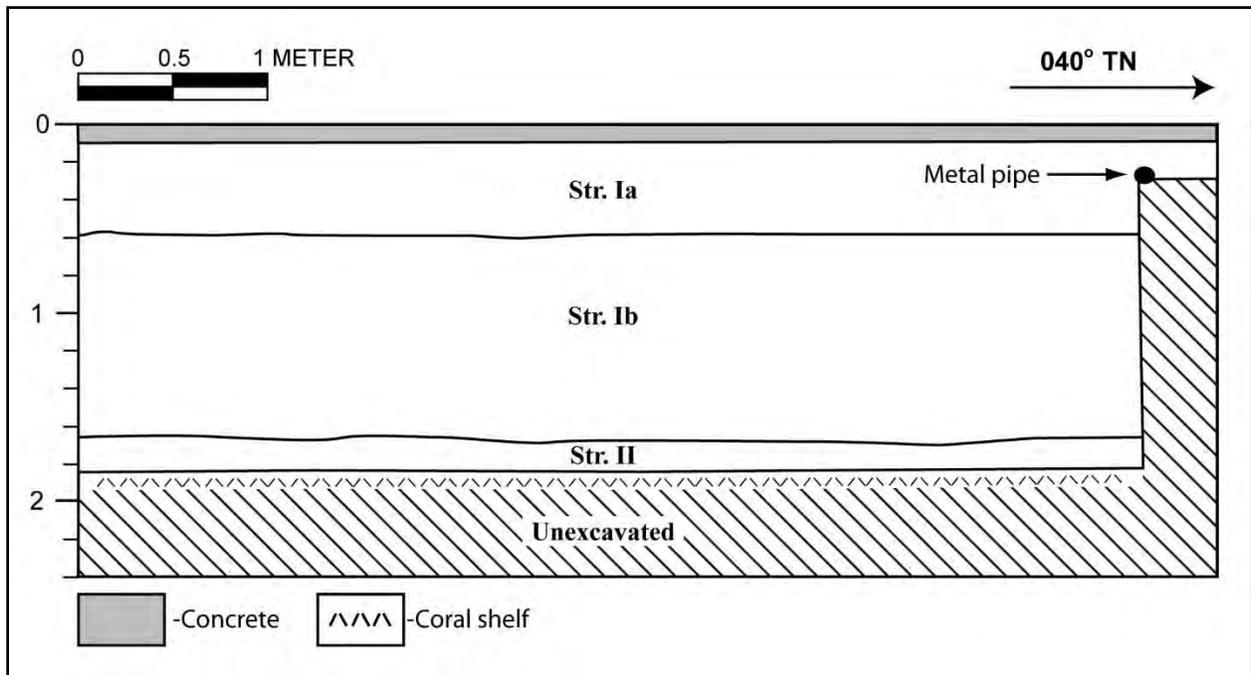


Figure 48. TE 4, stratigraphic profile of northwest sidewall



Figure 49. TE 4, photograph of northwest sidewall

## 4.2.2.5 Test Excavation 5

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 5 (TE 5) (Table 10, Figure 50, and Figure 51) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried sandy loam A horizon enriched with cultural material. Stratum IV marks the transition of a semi-marine environment (i.e., tidal flats) (Stratum IVa; Zone 2) into a waterlogged environment (i.e., coastal lagoon) (Stratum IVb; Zone 3) that existed within the immediate area prior to historic land reclamation. Excavation of TE 5 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a buried A horizon that developed atop naturally deposited sandy clay (Stratum IVa) and that is enriched with cultural material (SIHP # -7580). Marine shell midden, fish bone, charcoal, and fire-cracked rock were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), with the lower boundary being intact. A large modern disturbance (i.e., filled-in excavation) cuts through the fill layers (Strata I and II), the cultural layer (Stratum III), and the underlying natural sediments (Stratum IV) to the contact with the coral shelf (see Figure 50).

Table 10. Strata Observed at Test Excavation 5

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
N/A	10-180	Modern utility trench. The fill is a mixture of Strata Ia through IVb sediments.
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single grain; dry, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral base course material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-60	7.5YR 4/4, brown; clay loam; moderate, medium, blocky structure; moist firm consistency; slightly plastic; terrigenous origin; very abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	60-110	2.5Y 6/3, light yellowish brown; sandy clay; structureless massive; moist friable consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported dredge material; imported fill utilized for historic land reclamation.
IIb	40-150	2.5Y 4/2, dark grayish brown; very gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material containing volcanic cinder pockets; imported fill utilized for historic land reclamation.
III	110-140	10YR 2/1, black; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; clear lower boundary; smooth topography; observed cultural material: sea shell midden (sea urchin spine), fish bone midden (Parrot and Puffer fish), basalt fire-cracked rock, and charcoal (not collected); buried A horizon enriched with traditional Hawaiian cultural material; designated as a component of SIHP # -7580
IVa	120-150	2.5Y 6/3, light yellowish brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin; clear lower boundary; smooth topography; naturally deposited marine sandy clay. This stratum is indicative of the semi-marine (i.e., tidal flats) environment prior to historic land reclamation.
IVb	150-180	GLEY 1 7/10Y; light greenish gray; clay; structureless massive; wet, sticky consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation; Zone 3.

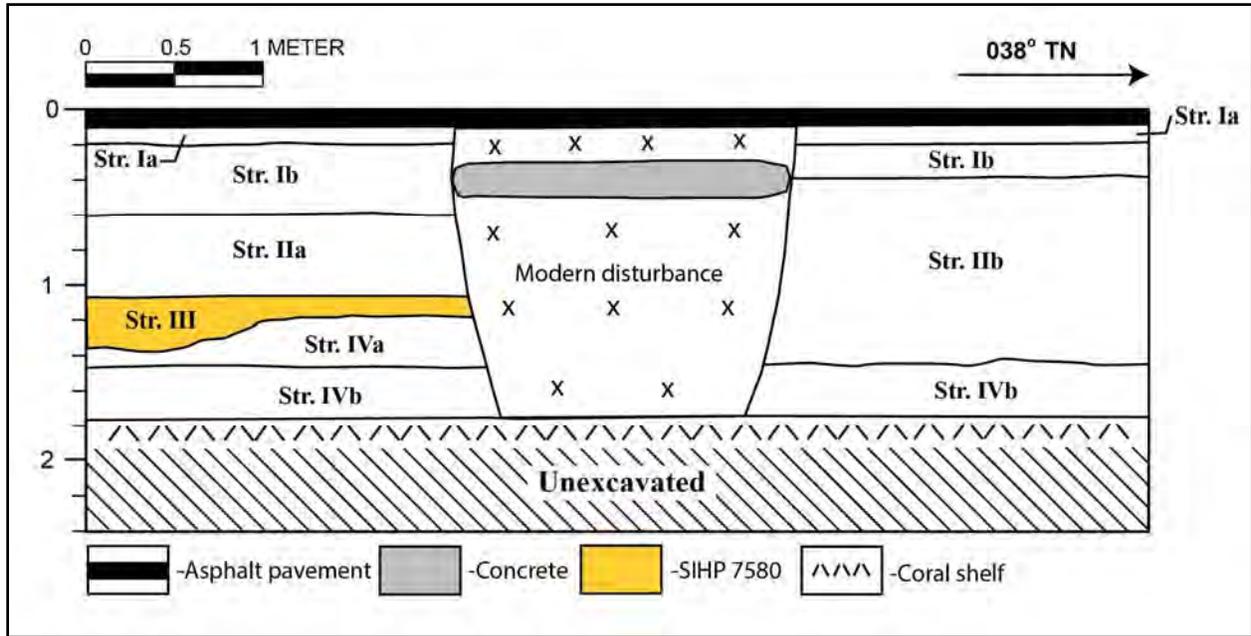


Figure 50. TE 5, stratigraphic profile of northwest sidewall



Figure 51. TE 5, photograph of northwest sidewall

## 4.2.2.6 Test Excavation 6

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 6 (TE 6) (Table 11, Figure 52, and Figure 53) consists of imported fill (Stratum I and Stratum II) deposited atop the coral shelf (i.e., limestone bedrock). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill utilized for historic land reclamation. Excavation of TE 6 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 11. Strata Observed at Test Excavation 6

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt surface
Ia	10-20	10YR 8/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary, smooth topography; imported crushed coral base course material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-40	7.5YR 2.5/3, very dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; terrigenous origin; very abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is associated with construction of the existing asphalt surface.
II	40-170	10YR4/1, dark gray; very cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; imported mixture of crushed coral and volcanic cinder fill materials; imported fill utilized for historic land reclamation.

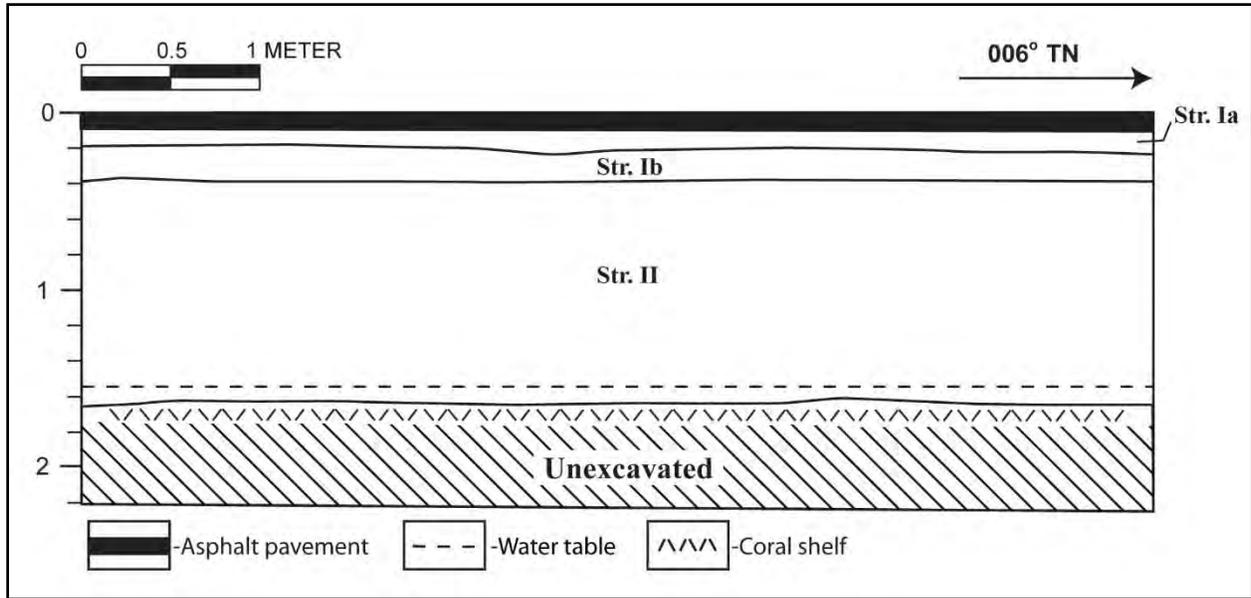


Figure 52. TE 6, stratigraphic profile of west sidewall



Figure 53. TE 6, photograph of west sidewall

## 4.2.2.7 Test Excavation 7

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 7 (TE 7) (Table 12, Figure 54, and Figure 55) consists of imported fill (Stratum I and Stratum II), a buried A horizon (Stratum III), and naturally deposited sediments (Stratum IV and Stratum V). Stratum I consists of imported fill utilized for construction of the existing asphalt surface. Stratum II (IIa and IIb) consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed at the transitional zone between wet and dry environments. Stratum IV (IVa and IVb) consists of naturally deposited sandy clay indicative of a semi-marine environment (i.e., tidal flats; Zone 2). Stratum V consists of anaerobic soils developed while completely waterlogged, suggesting the former presence of a coastal lagoon environment (Zone 3) prior to land reclamation. Excavation of TE 7 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

TE 7 is of interest as the observed stratigraphy indicates the immediate area was once a transitional zone between wet and dry environments, with tidal flats and a sand dune formerly existing within the southern portion of the project area and a coastal lagoon within the northern portion (see Figure 37 and Figure 56). Stratum III, a buried A horizon within the southern portion of TE 7, was observed to contain natural hydraulic sorting of organics and sand deposits that likely represents tidal fluctuations at the interface between the tidal flats and a coastal lagoon. The northern portion of the excavation contained anaerobic soils developed in waterlogged conditions (Stratum V) and represents the former presence of a coastal lagoon environment (Zone 3).

Table 12. Strata Observed at Test Excavation 7

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
I	10-40	5YR 3/2, dark reddish brown; extremely gravelly silt loam; weak, very fine structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	40-160	2.5YR 8/4, pale yellow; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder; large coral boulders observed throughout the stratum; imported fill utilized for historic land reclamation.
IIb	80-100	2.5Y 6/2, light brownish gray; clay; structureless massive; moist, firm consistency; slightly plastic; marine origin; abrupt lower boundary; broken/discontinuous topography; imported marine dredge material; imported fill utilized for historic land reclamation.
III	100-110	2.5Y 2.5/1, black; sandy loam; weak, fine, crumb structure; moist loose consistency; non-plastic; mixed origin; diffuse lower boundary; broken/discontinuous topography; common, fine roots; buried A horizon showing natural hydraulic sorting between decomposing organics and sand; no cultural material observed; represents an area that underwent tidal fluctuation or that was subjected to alternating periods of water exposure.
IVa	105-140	2.5Y 6/4, light yellowish brown; sandy clay; structureless massive; moist, friable consistency; slightly plastic; marine origin; diffuse lower boundary; broken/discontinuous topography; naturally deposited sandy clay; Tidal flats; Zone 2.
IVb	140-170	2.5Y 6/3, light yellowish brown; clay; structureless massive; wet sticky consistency; plastic; marine origin; lower boundary not visible; broken/discontinuous topography; naturally deposited marine sediment atop limestone bedrock; reclamation; Tidal flats; Zone 2.
V	160-170	GLEY 1 5/10Y; greenish gray; clay; structureless, massive; wet, sticky consistency; plastic; marine origin; broken/discontinuous topography; naturally deposited marine clay atop limestone bedrock. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation; Zone 3.

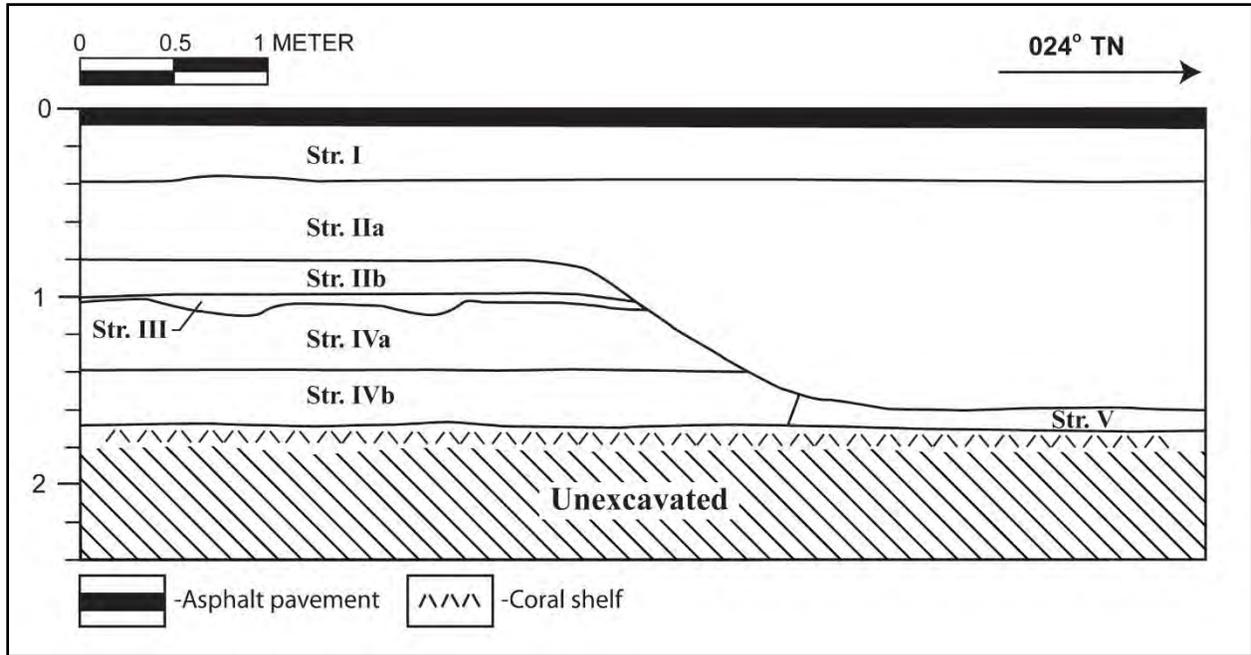


Figure 54. TE 7, stratigraphic profile of west sidewall



Figure 55. TE 7, photograph of west sidewall

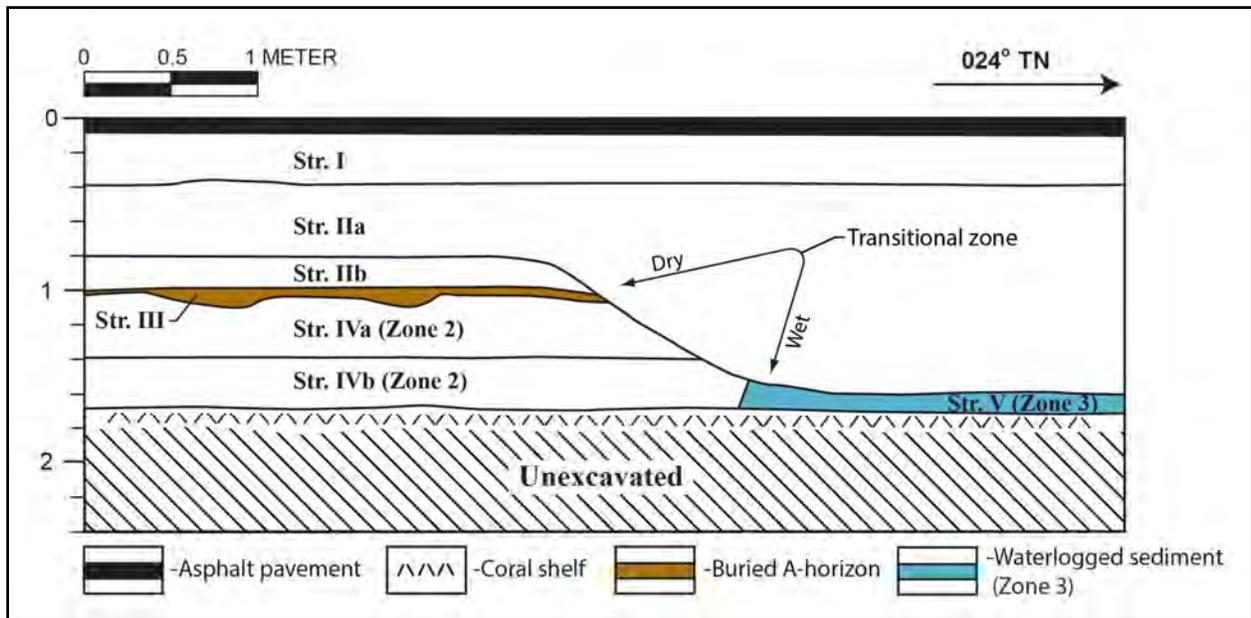


Figure 56. TE 7, stratigraphic profile of west sidewall, showing transition from dry to waterlogged sediments

## 4.2.2.8 Test Excavation 8

<b>Length:</b>	6 m
<b>Width:</b>	0.6 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 8 (TE 8) (Table 13, Figure 57, and Figure 58) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia-Ib) consists of imported fill material utilized for the construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported historic land reclamation fill. Stratum III (IIIa-IIIc) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a buried culturally enriched A horizon that developed atop naturally deposited sediments and that is enriched with traditional Hawaiian and historic cultural material. Stratum V (Va-Vb) consists of naturally deposited sandy clay sediments indicating the presence of a semi-marine environment (i.e., tidal flats; Zone 2) prior to historic land reclamation. Excavation of TE 8 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing early to mid-twentieth century artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass, ceramic, and metal fragments were observed (not collected) throughout the stratum. Charcoal flecking was also observed. Stratum II is considered to be a cultural layer based on the presence of cultural material and a subsurface pit feature (see below), and has been designated as SIHP # -7578.

One pit feature (SIHP # -7578, Feature A) was observed associated with Stratum II (SIHP # -7578) within TE 8 (Table 14). SIHP # -7578, Feature A consists of a rectangular-shaped pit feature observed within the northeast sidewall of TE 8 (Figure 59). The feature originates from Stratum II and intrudes into Stratum Vb. It measures 130 cm long and 40 cm wide, and was present from 60 to 160 cm below the existing surface. The entire feature was excavated out of the sidewall in an attempt to identify any cultural content and to determine pit function. The feature's pit fill consisted of a mixture of Strata II, III, IV, and V. Observed cultural material consisted of a single glass bottle base and three ceramic fragments (not collected), all determined to be originally from Stratum II (SIHP # -7578). A thin (1 cm thick), heavily decomposed, wood plank was observed at the base of the feature. The exact function of SIHP # -7578, Feature A remains unknown.

Also of note is Stratum IV, a buried A horizon deposited atop naturally deposited sediments (Stratum V) containing cultural material. Marine shell midden, charcoal and fire-cracked rock were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), with the lower boundary being intact.

A 12-gallon sample (Sample Area 1) was collected at the base of TE 8 (see Figure 57) and screened for cultural content. The sample collected sediment from 110 cmbs (top of Stratum IV)

Table 13. Strata Observed at Test Excavation 8

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/3, pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
Ib	20-50	7.5YR 4/4, brown; clay loam; moderate, medium, blocky structure; moist firm consistency; slightly plastic; mixed origin; very abrupt lower boundary; smooth topography; imported clay loam fill material. This layer is associated with construction of the existing asphalt paved parking lot.
II	50-160	2.5YR 4/4, dark yellowish brown; sandy loam; weak, fine, crumb; moist loose consistency; non-plastic; mixed origin; abrupt lower boundary; wavy topography; contained historic bottle glass, ceramic fragments and charcoal flecking. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	60-100	10YR 8/3, very pale brown; very gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIb	70-100	10YR 3/3, very dark brown; clay loam; moderate, medium, blocky structure; moist, firm consistency; non-plastic; mixed origin; abrupt lower boundary; broken/discontinuous topography; imported fill material. This stratum is associated with historic land reclamation.
IIIc	80-110	10YR 8/2, very pale brown; clay; structureless massive; moist firm consistency; slightly plastic; marine origin; abrupt lower boundary; irregular topography; imported marine dredge clay fill material. This stratum is associated with historic land reclamation.
IV	100-135	10YR 3/2, very dark grayish brown; silty loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained sparse assorted marine shell midden, basalt FCR, clear glass fragment, and charcoal; buried A horizon that developed atop sandy clay and that is enriched with cultural material. This layer has been designated as a component of SIHP #-7580.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Va	110-160	2.5Y 7/4, pale yellow; sandy clay; structureless, massive; wet, slightly sticky consistency; slightly plastic; marine origin; diffuse lower boundary; smooth topography; naturally deposited marine sandy clay. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, Zone 2.
Vb	160-170	10YR 8/2, very pale brown; clay; structureless, massive; wet, sticky consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock, Zone 2; a fishbone and charcoal concentration (SIHP # -7580, Feature A) observed and collected.

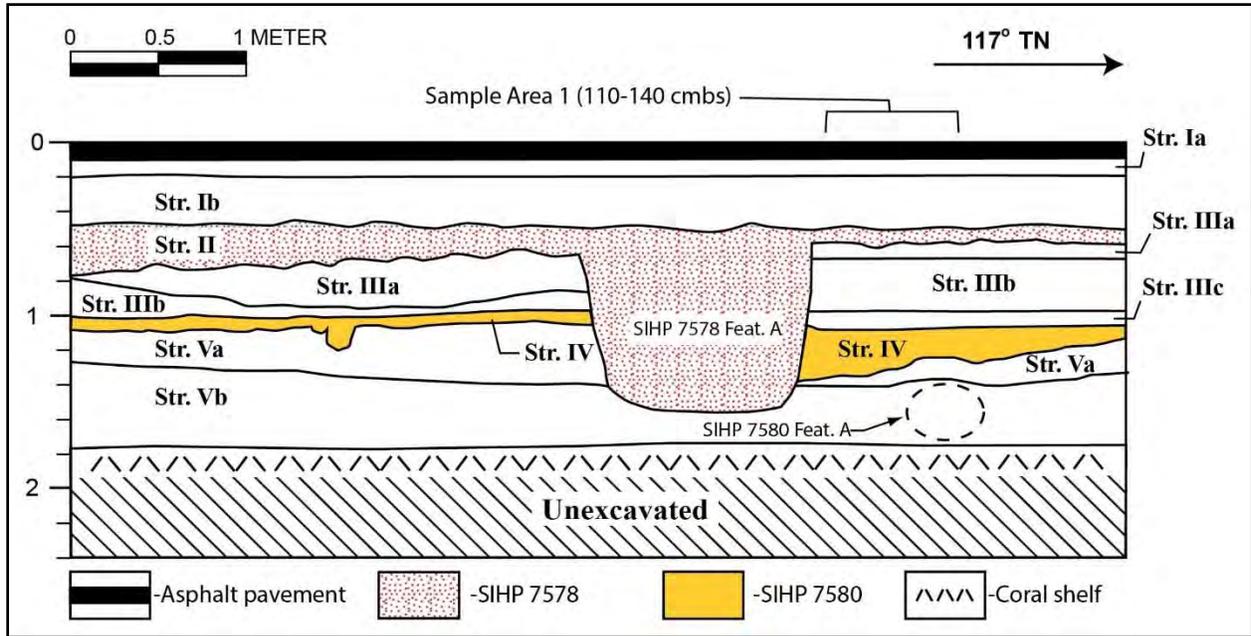


Figure 57. TE 8, stratigraphic profile of northeast sidewall



Figure 58. TE 8, photograph of northeast sidewall

Table 14. Pit Features Observed at TE 8

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	A	130 cm long x 40 cm wide	60-160	Mixture of Strata IIIa-IIIc, IV, Va, and Vb sediments	Rectangular-shaped pit feature observed within northeast sidewall of TE 8.  Feature originates from Stratum II and intrudes into Stratum Vb.	A single wooden plank at base of feature. Small red brick, glass, and ceramic fragments observed within pit fill (not collected); historic material widely dispersed, not concentrated.	Unknown
-7580	A	45 cm diameter	130-170	Stratum Vb sediment.	Feature consists of a circular concentration of fishbone and charcoal observed within northeast sidewall of TE 8. No pit outline observed.  Feature was observed to be isolated within Stratum Vb. The entire feature was sampled and screened (approx. 3 gallons).	Fishbone and charcoal (collected)	Refuse pit

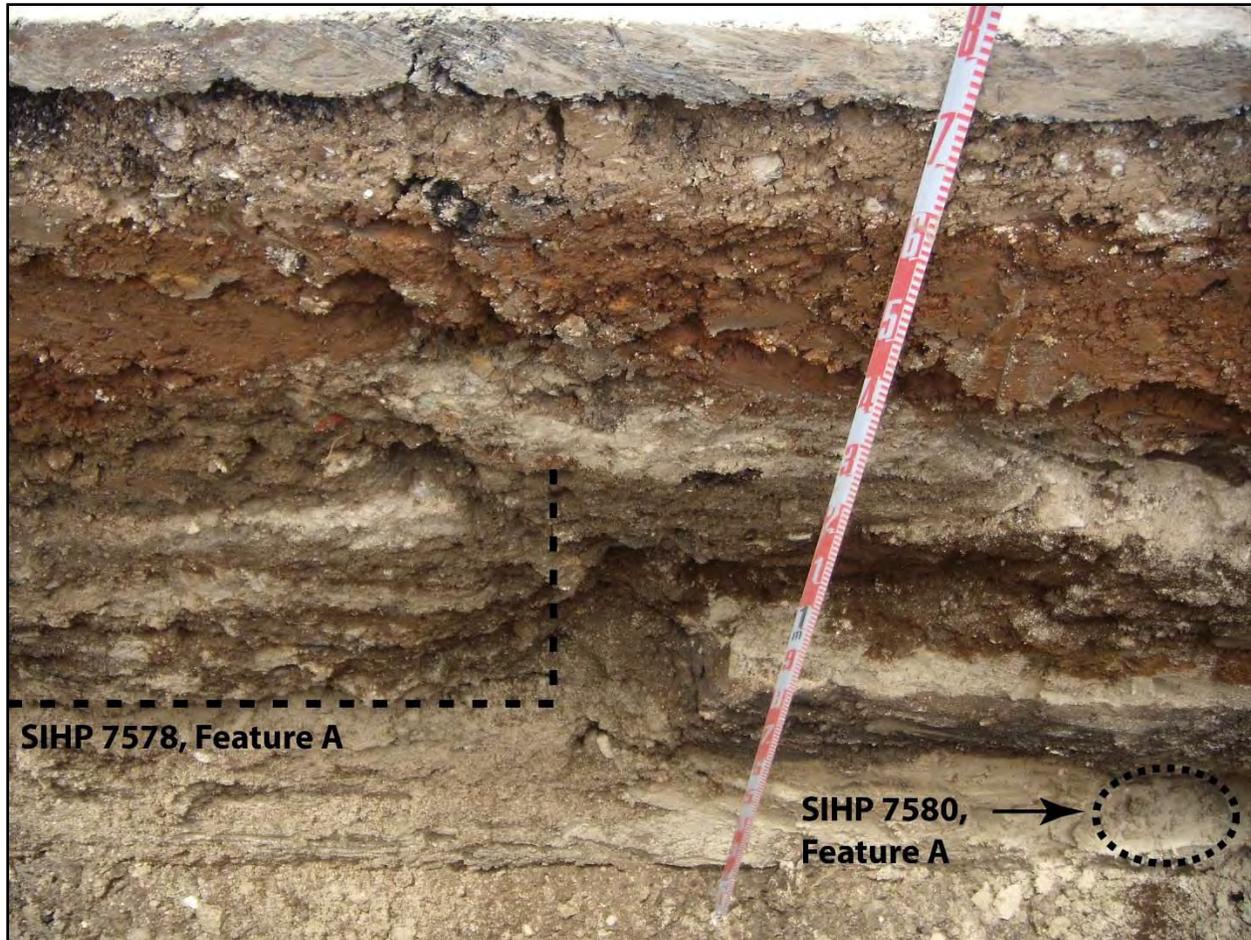


Figure 59. SIHP # -7578, Feature A (historic pit feature) and SIHP # -7580, Feature A (concentration of fish bone and charcoal), view to northeast

to 140 cmbs (bottom of Stratum IV). Observed cultural material consisted of marine shell midden, charcoal, and fire-cracked rock. Of note was the presence of a single clear glass fragment. The cultural material was collected for analysis (refer to Section 5 Results of Laboratory Analysis for detailed analysis).

Also of particular interest was the presence of a fishbone and charcoal concentration (SIHP - 7580, Feature A) observed within Stratum Vb (naturally-deposited marine clay) (see Table 14). The feature was observed within the northwest sidewall of TE 8, approximately 60 cm southeast of SIHP # -7578, Feature A (see Figure 57 and Figure 59). The feature was circular in shape, measuring 45 cm diameter in profile, and extending from 130 to 170 cm below the existing surface. No pit outline was observed. The entire feature was excavated and screened for content. All cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis below).

SIHP # -7580, Feature A consists of an isolated feature that is not stratigraphically associated with the greater SIHP # -7580 cultural layer; however it does contain similar cultural material and an overlapping radiocarbon date range. As it is a small isolated feature, designating it as its own historic property seemed inappropriate. Thus it was decided to combine SIHP # -7580, Feature A with the SIHP # -7580 cultural layer.

## 4.2.2.9 Test Excavation 9

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	W/E

The stratigraphy of Test Excavation 9 (TE 9) (Table 15, Figure 60, and Figure 61) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited marine sediments (Stratum V). Stratum I (Ia-Ib) consists of imported fill material utilized for the construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported fill utilized for historic land reclamation. Stratum III (IIIa-IIIb) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a buried culturally enriched A horizon developed atop naturally deposited sediments. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 9 indicates the presence of an elevated sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 9 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing historic artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass and ceramic fragments were observed dispersed within the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of post-Contact cultural material and has been designated as SIHP # -7578.

Also of note is Stratum IV, a buried A horizon that developed atop Jaucas sand (Stratum Va) and enriched with traditional Hawaiian cultural material. The observed cultural material included an adze fragment (Acc. # 2) (Figure 62), sparse marine shell midden, and charcoal. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), with the lower boundary being intact. Stratum IV is considered a cultural layer based on the presence of cultural material and a subsurface pit feature (see below), and has been assigned SIHP # -7580.

One pit feature (SIHP # -7580, Feature B) was observed to be associated with Stratum IV (SIHP # -7580) within TE 9 (Table 16). SIHP # -7580, Feature B consists of an amorphous-shaped pit feature observed within the north sidewall and in plan view of TE 9 (see Figure 60 and Figure 63). The feature originates from Stratum IV, extends through Stratum Va, and intrudes into Stratum Vb. It measures 120 cm long and 55+ cm wide, and was present from 110 to 140 cm below the existing surface. The entire feature was excavated from the base of TE 9 in an attempt to recover and identify cultural content to aid in identifying pit function. A controlled 8-gallon sample was collected from the cultural layer matrix (SIHP# -7580) at 110-140 cmbs, and screened prior to the feature's excavation (see Figure 60). The Feature B pit fill consisted of a mixture of Strata IV and V. Cultural materials observed within the pit fill consisted of fire-cracked rock (basalt), marine shell midden, charcoal, and faunal bone (pig). Cultural material

Table 15. Strata Observed at Test Excavation 9

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with the construction of the existing asphalt paved parking lot.
Ib	20-50	7.5YR 4/3, brown; clay loam; moderate, medium, blocky structure; moist firm consistency; slightly plastic; mixed origin; very abrupt lower boundary; smooth topography; imported clay loam fill material. This layer is associated with the construction of the existing asphalt paved parking lot.
II	50-60	2.5YR 4/2, dark grayish brown; silty loam; weak, fine, crumb; moist loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; contained glass and ceramic fragments; charcoal flecking also observed throughout stratum. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	60-70	10YR 8/2, pale brown; very gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIIb	70-100	10YR 6/8, pale brown; clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin; abrupt lower boundary; smooth topography; imported dredge clay fill material. This stratum is associated with historic land reclamation.
IV	100-130	2.5Y 4/2, dark grayish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained sparse marine shell midden, basalt fire-cracked rock, charcoal, faunal bone, and lined with charred basalt cobbles; buried A horizon developed atop Jaucas sand and enriched with cultural material. This layer has been designated as a component of SIHP # -7580.
Va	110-130	10YR 6/3, pale brown; fine sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Vb	130-170	10YR 8/2, very pale brown; sandy clay structureless massive; wet, sticky consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

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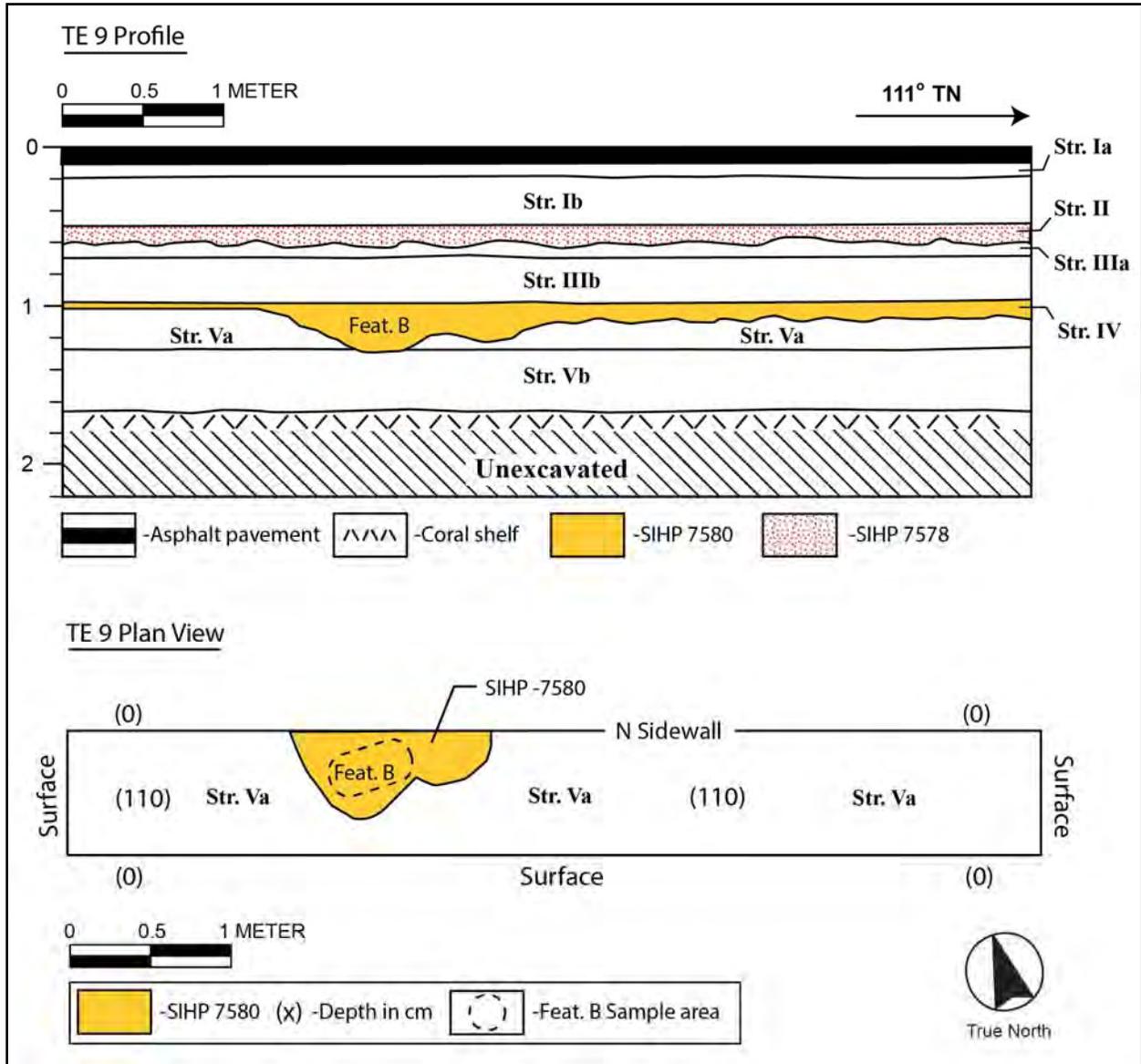


Figure 60. TE 9, stratigraphic profile of north sidewall (top) and plan view (bottom)



Figure 61. TE 9, photograph of northeast sidewall



Figure 62. Adze fragment (Acc. # 2) collected from Stratum IV (SIHP # -7580) within the base of TE 9

Table 16. Pit Features Observed at TE 9

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	B	120 cm long x 55+ cm wide	110-140	Mixture of Strata IV and V sediments	Amorphous pit feature observed within the north sidewall and in plan view of TE 9. Feature originates from Stratum IV and intrudes into Stratum Vb. Base of feature was lined with charred basalt cobbles.	Fire-cracked rock (basalt), marine shell midden, charcoal and faunal bone (pig)	Fire pit/Food preparation



Figure 63. Plan view of SIHP # -7580 Feature B (fire pit) within TE 9

from the 8-gallon sample was collected for analysis (see Section 5 Results of Laboratory Analysis below). Additionally, the base of the feature was lined with approximately eight charred basalt cobbles. Based on observed cultural material, SIHP # -7580, Feature B is identified as a fire pit utilized for food preparation.

## 4.2.2.10 Test Excavation 10

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	W/E

The stratigraphy of Test Excavation 10 (TE 10) (Table 17, Figure 64, and Figure 65) consists of imported fill (Stratum I) overlying naturally deposited sandy clay (Stratum II). Stratum I (Ia-Ic) consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation. Excavation of TE 10 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum Ic, an imported fill layer likely utilized for historic land reclamation, but repurposed (i.e., mixed and graded) during modern asphalt surface development. This stratum contained large concentrations of red brick, red clay tile, broken metal pipes, and glass fragments (Figure 66). It is believed these cultural materials are the remnants of a demolished building of unknown age and former location. The cultural material was noted but not collected.

Table 17. Strata Observed at Test Excavation 10

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-70	5YR 3/3, dark reddish brown; clay; structureless, massive; moist, firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported fill utilized to raise surface level associated with construction of the existing asphalt surface
Ic	70-110	10YR 3/2, very dark grayish brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; contained red brick, metal pipes, red tile, glass and metal fragments; imported fill related to historic land reclamation and repurposed during the construction of the existing asphalt surface.
II	110-170	10YR 8/2, pale brown; sandy clay; structureless, massive; wet sticky consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock. This stratum consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation.

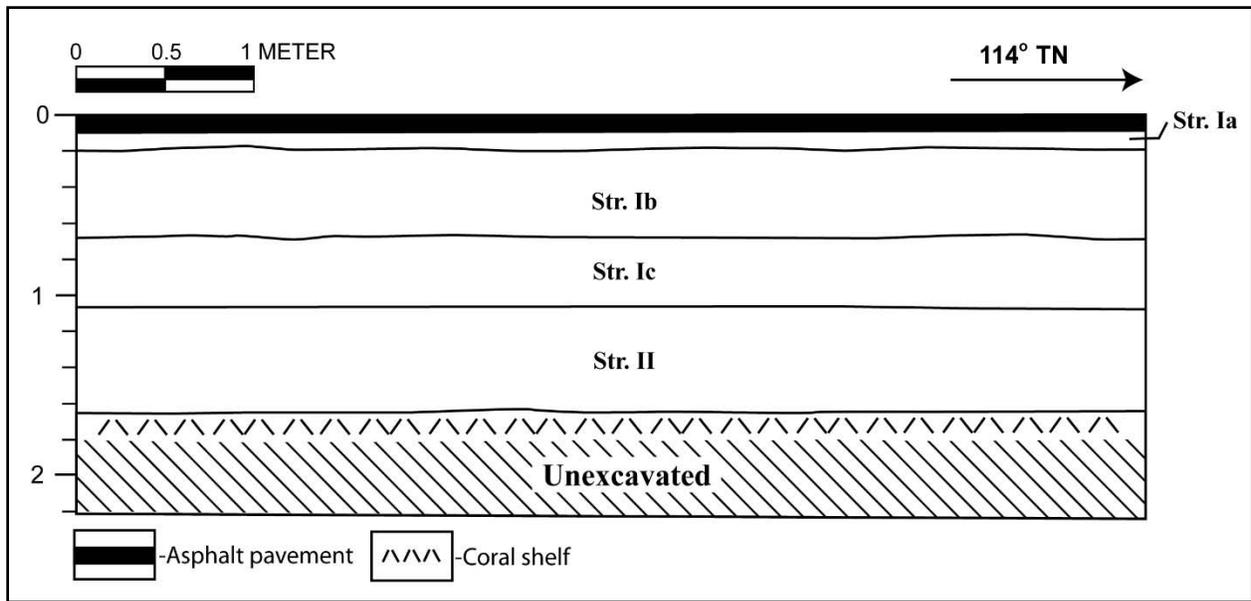


Figure 64. TE 10, stratigraphic profile of north sidewall



Figure 65. TE 10, photograph of north sidewall



Figure 66. Cultural material observed within TE 10, Stratum Ic

## 4.2.2.11 Test Excavation 11

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 11 (TE 11) (Table 18, Figure 67, Figure 68) consists of imported modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia-Ic) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a culturally enriched A horizon that developed atop a historic fill layer. Stratum III (IIIa-IIIb) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a buried A horizon that developed atop Jaucas sand and that is enriched with traditional Hawaiian cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 11 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 11 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing historic artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass and ceramic fragments were observed dispersed within the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of cultural material, and has been designated as SIHP # -7578.

Also of note is Stratum IV, a buried A horizon that developed atop Jaucas sand (Stratum Va) and enriched with cultural material. The observed cultural material included sparse marine shell midden, fire-cracked rock (basalt), and charcoal. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) with the lower boundary being intact. Stratum IV is considered a cultural layer based on the presence of cultural material, and has been designated as SIHP # -7580.

Table 18. Strata Observed at Test Excavation 11

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 7/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
Ib	20-70	5YR 3/3, dark reddish brown; clay; structureless massive; moist firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported clay fill material. This stratum is associated with construction of existing asphalt surface.
II	70-80	10YR 2/1, black; silty loam; weak, fine, crumb; moist loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; contained glass and ceramic fragments; charcoal flecking also observed throughout stratum. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	80-100	10YR 8/2, pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIb	100-120	10YR 6/3, pale brown; clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin; abrupt lower boundary; smooth topography; imported marine dredge clay fill material. This stratum is associated with historic land reclamation.
IV	100-120	2.5Y 4/2, dark grayish brown; sandy loam; weak, fine, crumb structure; moist loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; cultural materials included sparse marine shell midden, charcoal, and basalt fire-cracked rock (not collected); buried A horizon that developed atop Jaucas sand and enriched with cultural material. This layer has been designated as a component of SIHP # -7580.
Va	120-140	10YR 6/3, pale brown; fine sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune (Zone 1) amidst the tidal flats that defined the area prior to historic land reclamation.
Vb	140-180	10YR 8/3, very pale brown; clay; structureless massive; wet sticky consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

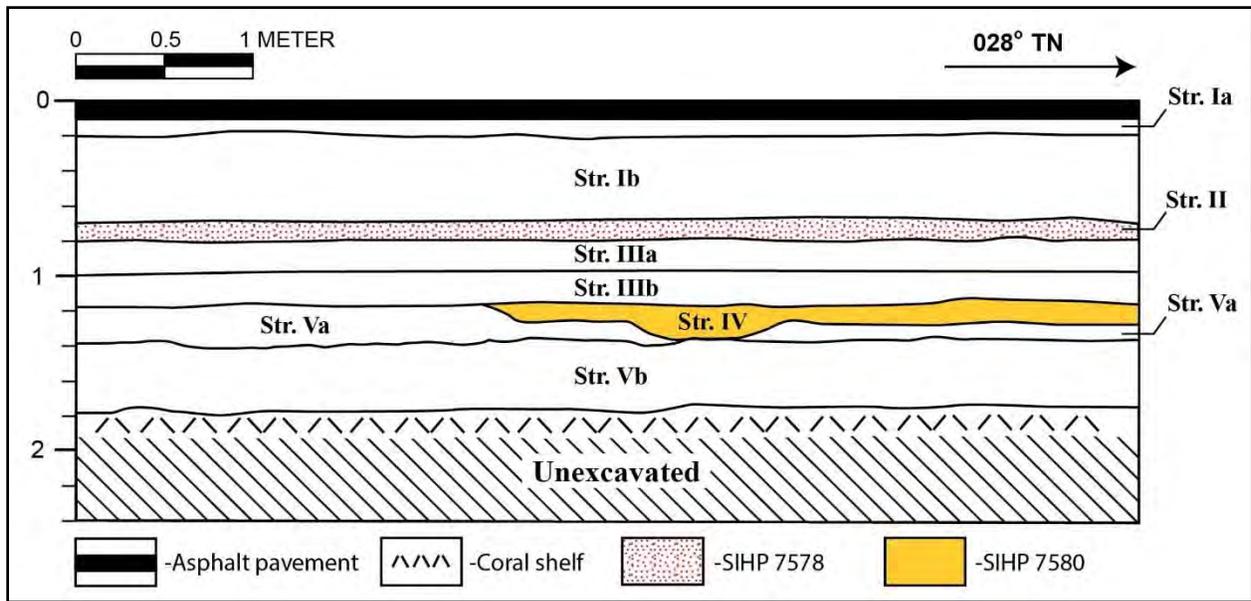


Figure 67. TE 11, stratigraphic profile of northwest sidewall



Figure 68. TE 11, photograph of northwest sidewall

## 4.2.2.12 Test Excavation 12

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 12 (TE 12) (Table 18, Figure 69, and Figure 70) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments. Stratum I consists of imported fill associated with development of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported historic land reclamation fill. Stratum III (IIIa-IIIc) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a buried A horizon that developed atop naturally deposited sediments and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 12 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation.

Of note is Stratum II, a buried A horizon containing historic artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass, ceramic, and metal fragments were observed (not collected) dispersed throughout the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of post-Contact artifacts and an associated pit feature (see below) and has been designated as SIHP # -7578.

A pit of unknown function (SIHP # -7578, Feature B) originating from this cultural layer (Stratum II) was observed in the east end of the excavation within the southwest sidewall (see Figure 69, Figure 71, and Table 20). The feature measured approximately 100 cm across and extended from 50 to 80 cm below the existing surface, originating from the base of Stratum II and intruding into the underlying historic land reclamation fill. Eight gallons of pit fill sediments were screened to better define pit content and function. A clear screw-top bottle, an amber Clorox bottle base, metal wire nails, a saw-cut cow bone, a metal spoon fragment, and miscellaneous bottle glass fragments were observed, but not collected (Figure 72).

Also of note is Stratum IV, a buried A horizon developed atop Jaucas sand (Stratum Va) and enriched with cultural material. Marine shell midden, charcoal, and fire-cracked rock were dispersed throughout the stratum (not collected). The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. Stratum IV is considered a cultural layer based on the presence of cultural material and associated pit features that originate within Stratum IV (see below) and has been designated as SIHP # -7580.

Four circular pit features associated with Stratum IV were observed in the base of TE 12 (SIHP # -7580, Subfeatures 1-4) (see Figure 69, Figure 73, and Table 20). All of the pit features originated at Stratum IV (buried A horizon) and intruded through Stratum V (Jaucas sand) and

Table 19. Strata Observed at Test Excavation 12

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/1, white; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of existing asphalt paved parking lot.
Ib	20-40	5YR 3/3, dark reddish brown; clay; structureless massive; moist firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported clay fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
II	40-80	10YR 2/2, very dark grayish brown; sandy loam; weak, fine, crumb; moist, very friable consistency; non-plastic; mixed origin; abrupt lower boundary; wavy topography; cultural material consisted of historic bottle glass, ceramic fragments, nails, and metal fragments. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	60-70	10YR 7/4, very pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIIb	70-90	10YR 6/3, pale brown; clay; structureless massive; wet sticky consistency; very plastic; marine origin; very abrupt lower boundary; smooth topography; imported dredged clay fill material. This stratum is associated with historic land reclamation.
IV	80-120	10YR 3/1, very dark gray; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; cultural material consisted of marine shell midden, fire-cracked rock (basalt), and charcoal; buried A horizon that developed atop Jaucas sand and enriched with cultural material; cultural layer also contains pit features. This layer has been designated as a component of SIHP # -7580.
Va	90-120	10YR 7/3, very pale brown; sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune (Zone 1) amidst the tidal flats that defined the area prior to historic land reclamation.
Vb	120-160	10YR 8/3, very pale brown; clay; structureless massive; wet sticky consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

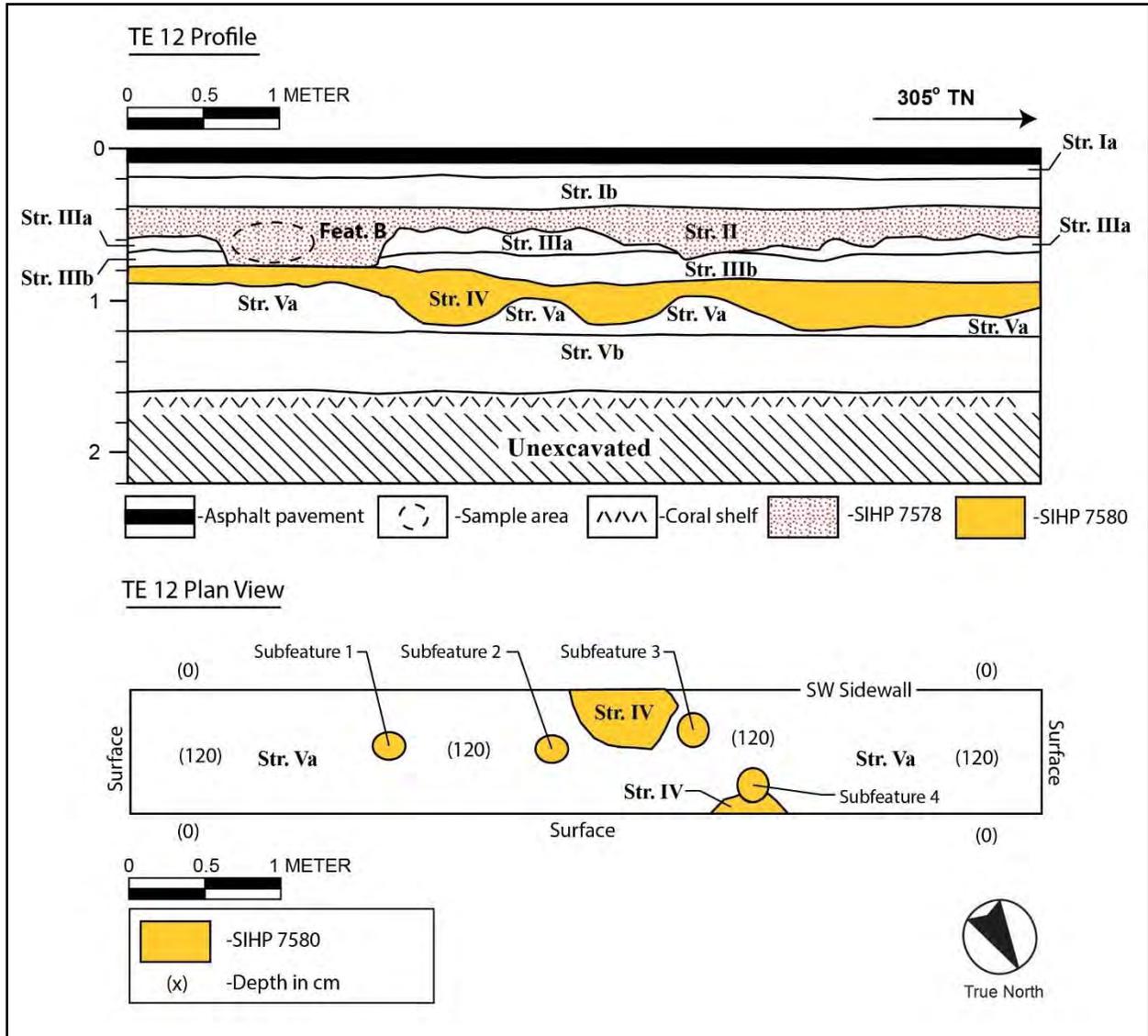


Figure 69. TE 12, stratigraphic profile of southwest sidewall (top) and plan view (bottom)



Figure 70. TE 12, photograph of southwest sidewall

Table 20. Pit Features Observed at TE 12

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	B	100 cm long	50-80	Mixture of Strata IIIa and IIIb sediments	Rectangular-shaped pit feature observed within the southwest sidewall of TE 12.  The feature originates in Stratum II and intrudes into Stratum IIIb.	Clear screw-top bottle, an amber Clorox bottle base, metal wire-cut nails, a saw-cut cow bone, a metal spoon fragment, and miscellaneous bottle glass fragments	Unknown
-7580	Subfeature 1	20 cm diameter	120-160	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view.  Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
-7580	Subfeature 2	20 cm diameter	120-140	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view.  Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
-7580	Subfeature 3	20 cm diameter	120-130	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view.  Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
-7580	Subfeature 4	25 cm diameter	115-150	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view.  Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold



Figure 71. TE 12, (SIHP # -7578, Feature B), view to southwest



Figure 72. Contents of TE 12 (SIHP # -7578, Feature B)



Figure 73. TE 12, SIHP # -7580, Subfeatures 1 through 4

into Stratum VI (marine clay). The average diameter of the pit features was 20 cm. Each pit feature was completely excavated and its contents screened to identify cultural material and to gather additional data towards determining their function. No cultural material was observed. Subfeatures 1 through 4 are identified as postmolds based on their circular shape, narrow diameter, and vertical extent.

## 4.2.2.13 Test Excavation 13

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 13 (TE 13) (Table 21, Figure 74, and Figure 75) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sandy clay (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of imported fill utilized for historic land reclamation. Stratum III (IIIa-IIIb) consists of naturally deposited sediment indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 13 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 21. Strata Observed at Test Excavation 13

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-30	10YR 3/4, dark yellowish brown; silty clay; weak, fine, crumb structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This layer is associated with construction of the existing asphalt surface.
II	30-60	10YR 3/3, dark brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIa	60-140	2.5Y 7/3, pale yellow; sandy clay; structureless massive; moist firm consistency; slightly plastic; marine origin; diffuse lower boundary; smooth topography; naturally deposited sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, Zone 2.
IIIb	140-180	2.5Y 7/2, light gray; clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin; naturally deposited marine clay atop limestone bedrock, tidal flats; Zone 2.

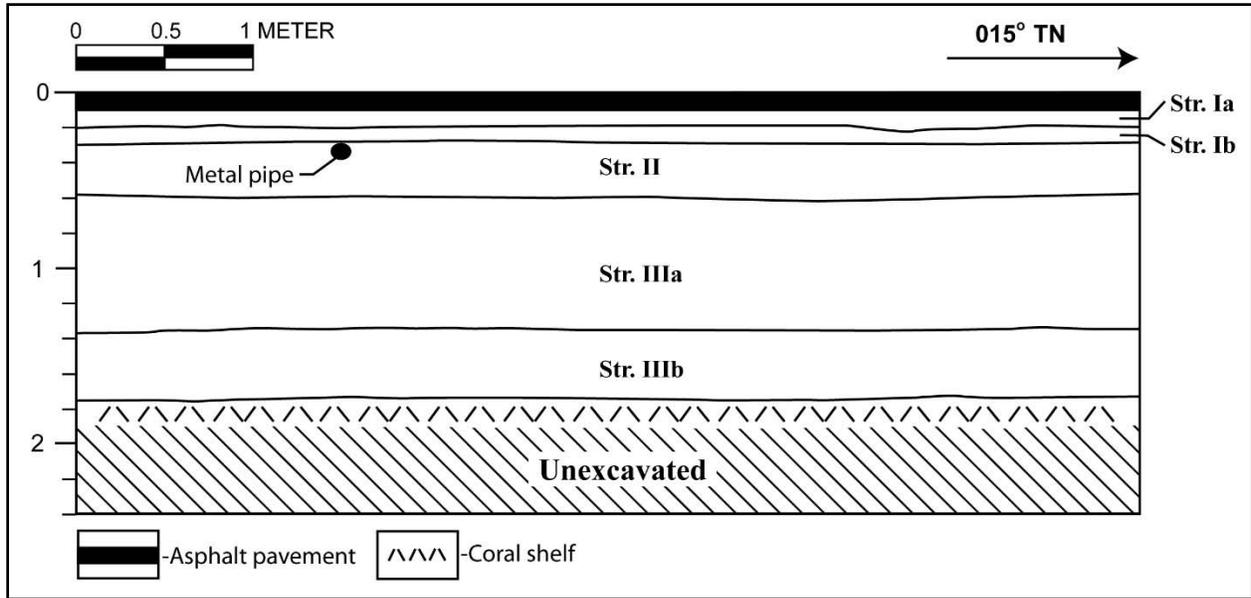


Figure 74. TE 13, stratigraphic profile of west sidewall



Figure 75. TE 13, photograph of west sidewall

## 4.2.2.14 Test Excavation 14

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 14 (TE 14) (Table 22, Figure 76, and Figure 77) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sandy clay (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt paved parking lot. Stratum II consists of imported fill utilized for historic land reclamation. Stratum III (IIIa-IIIb) consists of naturally deposited sediments indicative of the semi-terrestrial environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 14 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 22. Strata Observed at Test Excavation 14

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-60	5YR 3/3, dark reddish brown; clay; structureless massive; moist firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported clay fill material. This stratum is associated with construction of the existing asphalt surface.
II	60-90	10YR 6/3, pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIa	90-160	10YR 6/2, pale brown; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin; abrupt lower boundary; smooth topography; natural sorting of sand and clay; naturally deposited marine sandy clay. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, tidal flats; Zone 2.
IIIb	160-180	2.5Y 8/2, pale yellow; clay; structureless massive; wet, sticky consistency; very plastic; marine origin; naturally deposited marine clay atop limestone bedrock tidal flats; Zone 2.

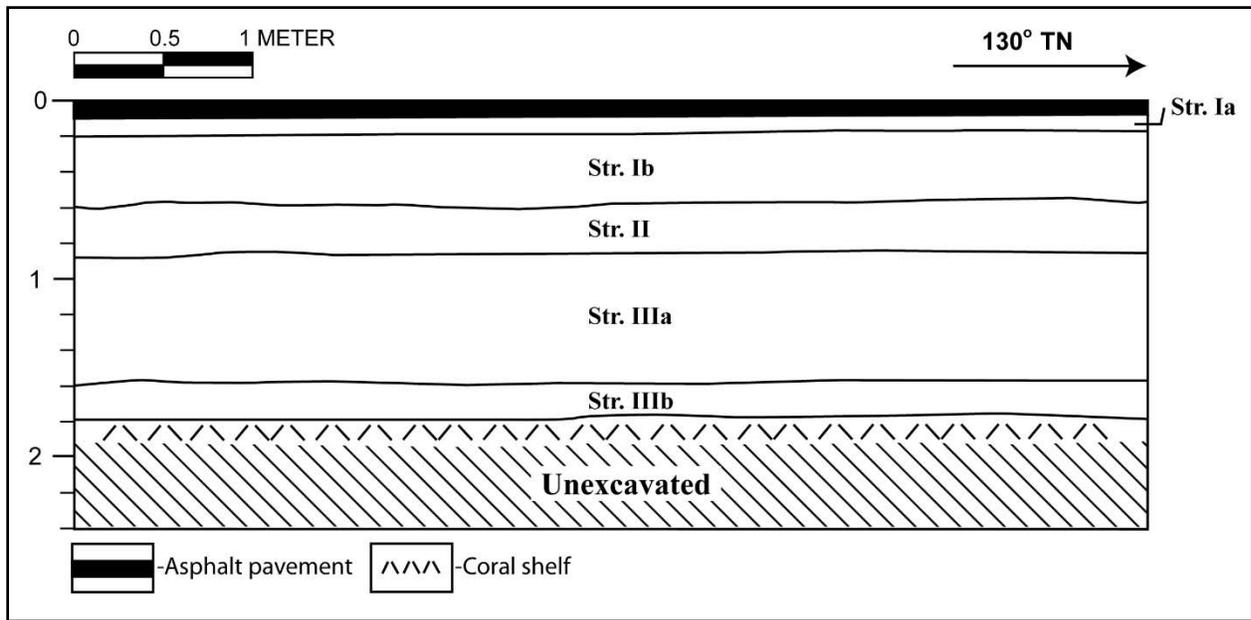


Figure 76. TE 14, stratigraphic profile of northeast sidewall



Figure 77. TE 14, photograph of northeast sidewall

## 4.2.2.15 Test Excavation 15

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 15 (TE 15) (Table 23, Figure 78, and Figure 79) consists of imported fill layers (Stratum I and Stratum II) atop naturally deposited marine sediment (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III (Stratum IIIa-IIIb) consists of naturally deposited sediment developed atop the coral shelf (i.e., limestone bedrock). This stratum is indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 15 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 23. Strata Observed at Test Excavation 15

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
Ib	20-40	5YR 3/3, dark reddish brown; clay; structureless, massive; moist firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported clay fill material related to urban development
II	40-100	10YR 6/3, pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIa	100-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; moist, firm consistency; slightly plastic; marine origin; diffuse lower boundary; wavy topography; naturally deposited marine sandy clay. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, tidal flats; Zone 2.
IIIb	150-180	10YR 7/2, light gray; clay; structureless, massive; wet sticky consistency; plastic; marine origin; This stratum consists of naturally deposited marine clay atop limestone bedrock, tidal flats; Zone 2.

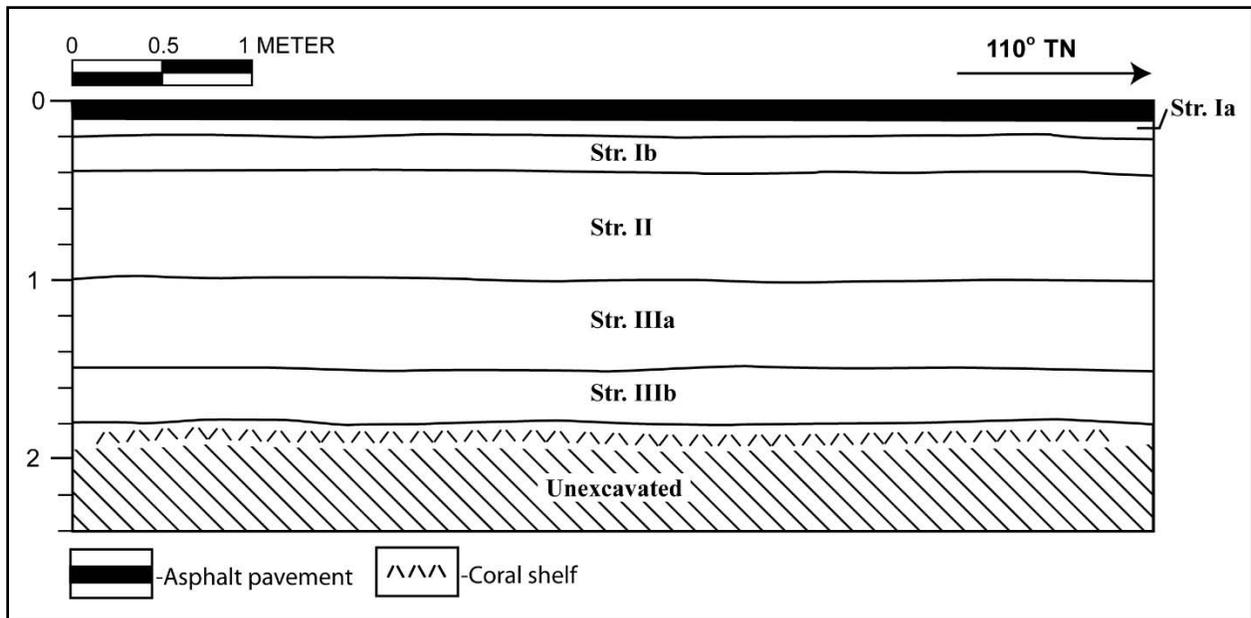


Figure 78. TE 15, stratigraphic profile of north sidewall



Figure 79. TE 15, photograph of north sidewall

## 4.2.2.16 Test Excavation 16

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 16 (TE 16) (Table 24, Figure 80, and Figure 81) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited clay (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt paved parking lot. Stratum II consists of imported fill utilized for historic land reclamation. Stratum III consists of naturally deposited sediment indicative of the semi-terrestrial environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 16 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is the presence of a large disturbance that removed much of Strata II and III within TE 16. This disturbance consists of a backfilled trench associated with installation of a subsurface utility line. The utility trench backfill matrix consists of mixed Stratum II and III sediments.

Table 24. Strata Observed at Test Excavation 16

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-70	5YR 3/3, dark reddish brown; clay loam; moderate, medium, blocky structure; moist, firm consistency; plastic; abrupt lower boundary; smooth topography; imported clay loam fill material associated with construction of the existing asphalt surface
II	70-100	10YR 5/2, grayish brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	100-180	10YR 7/2, light gray; clay; structureless massive; wet, sticky consistency; plastic; marine origin; This stratum consists of naturally deposited marine clay atop limestone bedrock, tidal flats; Zone 2.

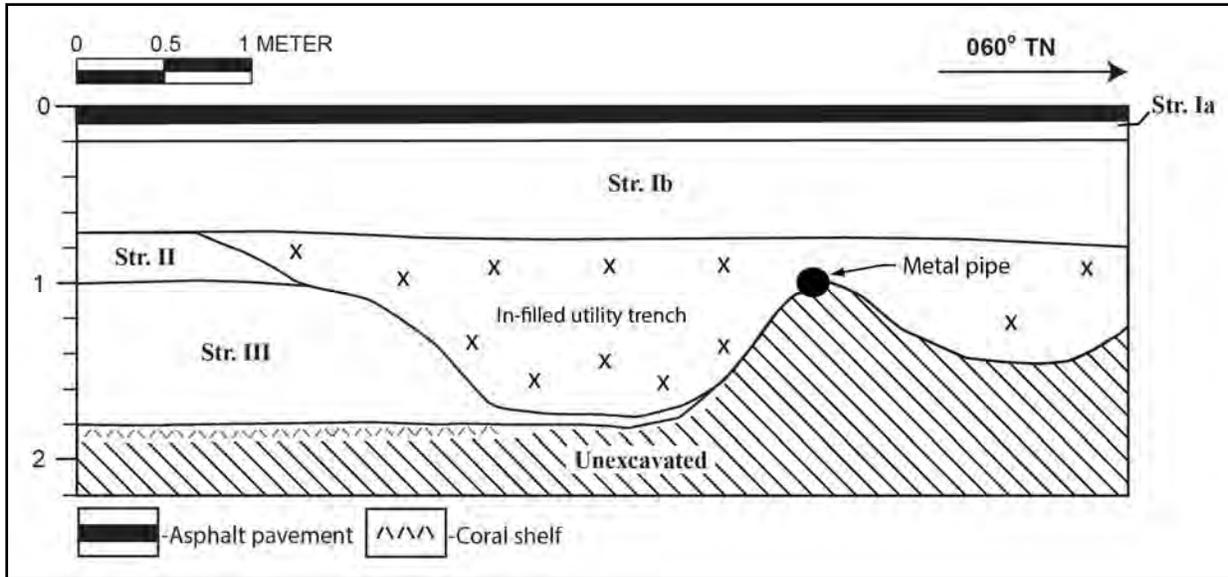


Figure 80. TE 16, stratigraphic profile of northwest sidewall



Figure 81. TE 16, photograph of northwest sidewall

## 4.2.2.17 Test Excavation 17

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 17 (TE 17) (Table 25, Figure 82, and Figure 83) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited clay (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt paved parking lot. Stratum II consists of imported fill utilized for historic land reclamation). Stratum III consists of naturally deposited sediment indicative of the semi-terrestrial environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 17 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 25. Strata Observed at Test Excavation 17

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-80	5YR 3/3, dark reddish brown; clay loam; moderate, medium, blocky structure; moist, firm consistency; plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported clay loam fill material associated with the construction of the existing asphalt surface
II	80-140	10YR 7/2, light gray; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	140-170	10YR 7/2, light gray; clay; structureless massive; wet, very sticky consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, tidal flats; Zone 2.

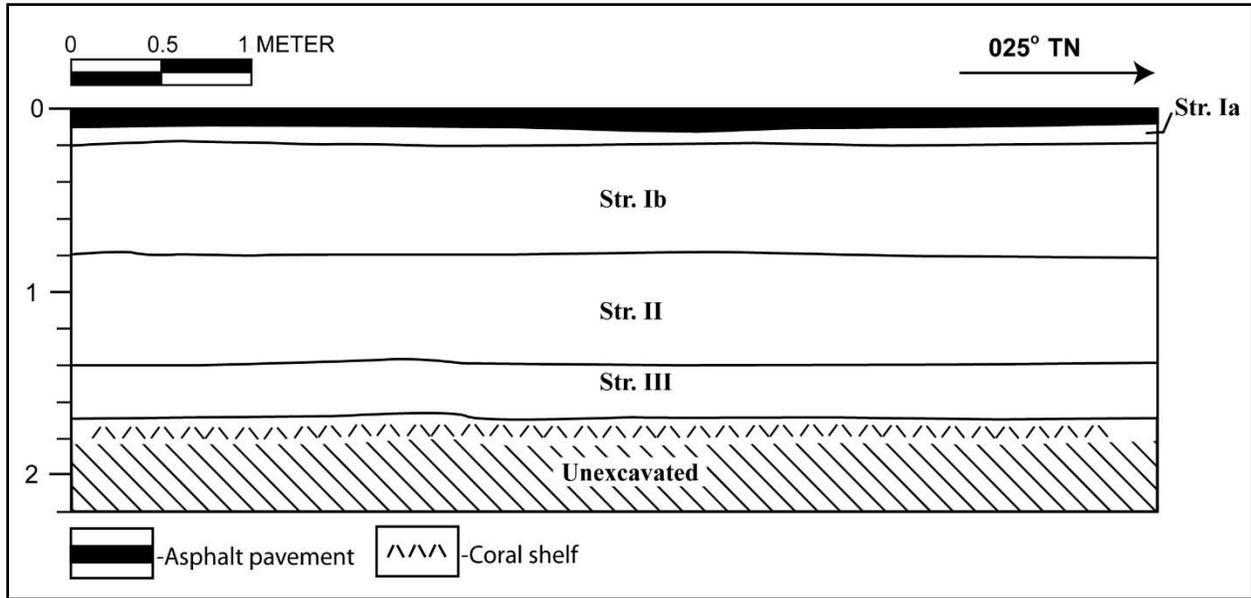


Figure 82. TE 17, stratigraphic profile of northwest sidewall



Figure 83. TE 17, photograph of northwest sidewall

## 4.2.2.18 Test Excavation 18

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 18 (TE 18) (Table 26, Figure 84, and Figure 85) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop the imported fill layer. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (limestone bedrock). The Jaucas sand observed at TE 18 indicates the presence of an sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 18 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing early to mid-twentieth century artifacts atop deposited historic land reclamation fill sediments (Stratum III). Glass bottles, a ceramic tube, and one cut basalt block were observed within the stratum. Charcoal flecking was also observed. Cultural material (excluding the basalt block) from this stratum was collected for analysis (see Section 5 Results of Laboratory Analysis below).

Stratum II is considered a cultural layer based on the presence of cultural material and has been designated as a component of SIHP # -7578.

Table 26. Strata Observed at Test Excavation 18

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	7.5YR 7/6, reddish yellow; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-70	7.5YR 3/4, dark brown; clay loam; moderate, fine, blocky structure; moist, very firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This layer is associated with construction of the existing asphalt surface.
II	40-80	10YR 3/4, dark yellowish brown; loam; weak, fine, crumb; moist loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; contained glass bottles, ceramic tube, and a cut basalt block; charcoal flecking throughout stratum. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	70-100	10YR 8/3, very pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIIb	90-110	10YR 3/2, very dark grayish brown; silt; moderate, medium, crumb structure; dry, slightly hard consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported silt fill material. This layer is associated with historic land reclamation.
IVa	100-130	10YR 7/3, very pale brown; fine sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
IVb	120-170	2.5Y 7/2, light gray; sandy clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine sandy clay atop limestone bedrock, Zone 1.

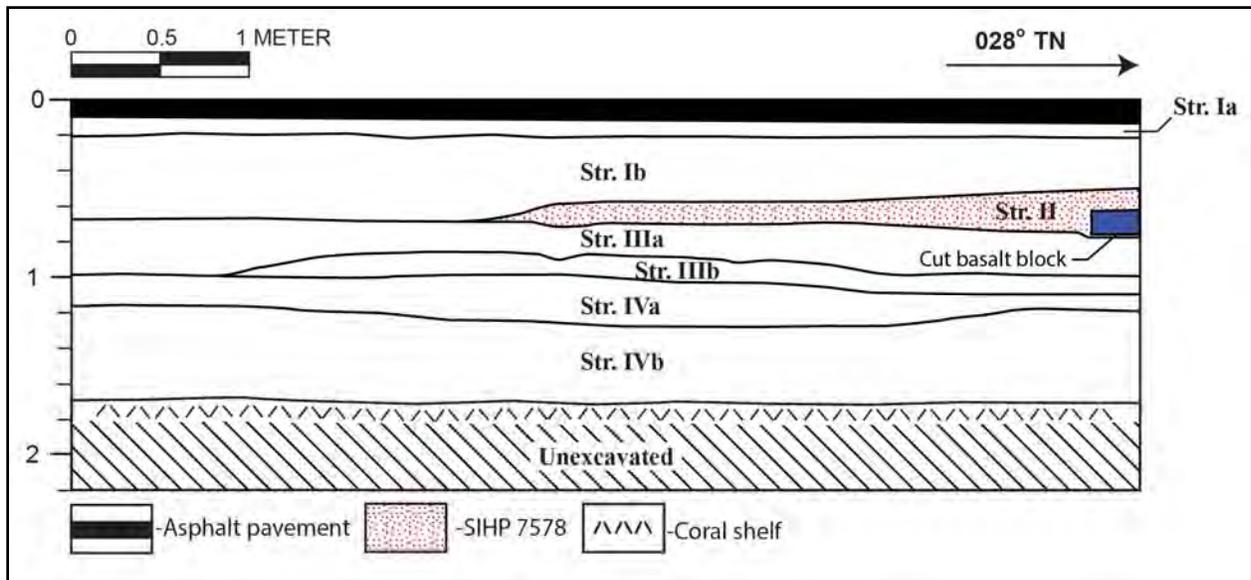


Figure 84. TE 18, stratigraphic profile of west sidewall



Figure 85. TE 18, photograph of west sidewall

## 4.2.2.19 Test Excavation 19

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 19 (TE 19) (Table 27, Figure 86, and Figure 87) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally sterile A horizon (Stratum IV), and naturally-deposited sediments (Stratum V). Stratum I consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported historic land reclamation fill. Stratum III (IIIa and IIIb) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a culturally sterile A horizon that developed atop Jaucas sand. Stratum V consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) developed atop the coral shelf (limestone bedrock). The Jaucas sand observed at TE 19 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 19 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing historic artifacts atop deposited historic land reclamation fill sediments (Stratum III). Metal, glass, and ceramic fragments were observed dispersed within the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of cultural material, and has been designated as SIHP # -7578.

One pit feature (SIHP # -7578, Feature C) was identified as being associated with Stratum II (SIHP # -7578) within TE 19 (Table 28). SIHP # -7578, Feature C consists of a trapezoid-shaped pit visible in the north sidewall of TE 19 (see Figure 86 and Figure 87). The feature originates from the base of Stratum II and intrudes into Stratum IV. It measures 140 cm long and was present from 60 to 110 cm below the existing surface. The feature's pit fill consisted of a mixture of Strata II, III, and IV. Observed cultural material consisted of moderate amounts of broken glass bottles, metal and ceramic fragments (not collected) (Figure 88). SIHP # -7578, Feature C is a pit of unknown function.

Table 27. Strata Observed at Test Excavation 19

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/3, pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-60	7.5YR 4/4, brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This layer is associated with construction of the existing asphalt surface.
II	60-110	10YR 2/2, very dark brown; silty loam; weak, fine, crumb; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; contained charcoal flecking, metal, glass, and ceramic fragments. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	70-100	2.5Y 6/3, light yellowish brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIIb	80-100	2.5Y 7/2, very dark grayish brown; dredge clay; structureless massive; moist firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported marine dredge clay fill material. This layer is associated with historic land reclamation.
IV	100-110	2.5Y 3/2, very dark grayish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; buried A horizon atop natural Jaucas sand; no cultural material observed.
Va	110-140	2.5Y6/4, light yellowish brown; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	140-170	2.5Y 7/2, light gray; sandy clay; structureless massive; moist firm consistency; slightly plastic; marine origin; This stratum consists of naturally deposited marine sandy clay atop limestone bedrock, Zone 1.

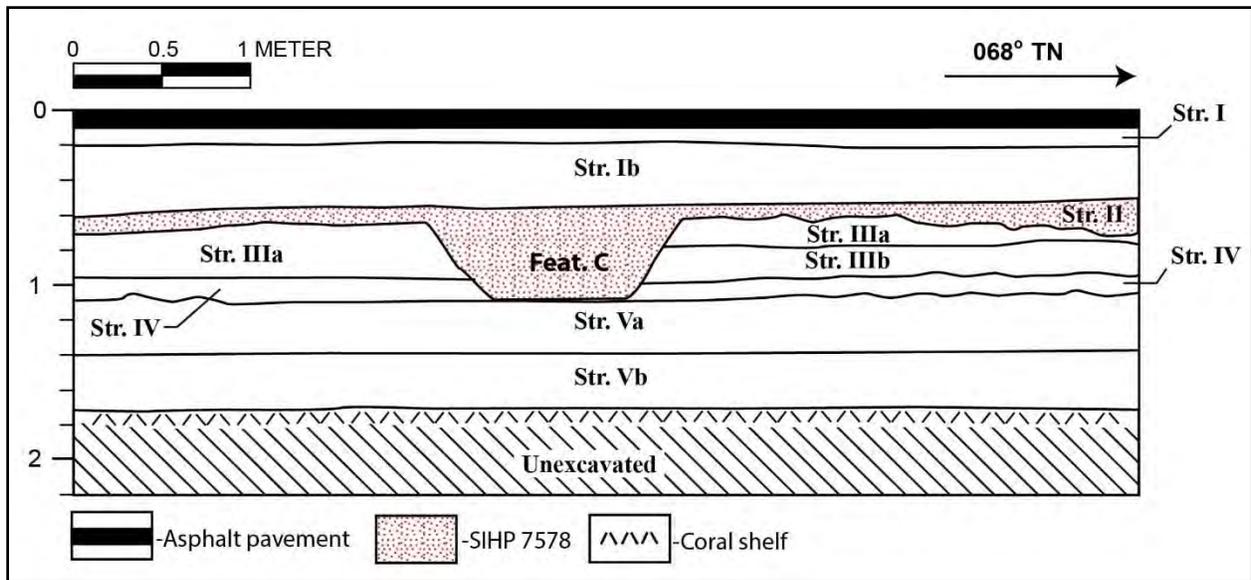


Figure 86. TE 19, stratigraphic profile of north sidewall



Figure 87. TE 19, photograph of north sidewall

Table 28. Pit Features Observed at TE 19

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	C	140 cm long	60-110	Mixture of Strata IIIa, IIIb, and IV sediments	Trapezoid-shaped pit feature observed in north wall. Feature originates in Stratum II and intrudes into Stratum IV.	Broken glass bottles, metal and ceramic fragments	Unknown



Figure 88. A grab sample of cultural material observed within SIHP # -7578, Feature C

## 4.2.2.20 Test Excavation 20

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 20 (TE 20) (Table 29, Figure 89, and Figure 90) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported historic land reclamation fill. Stratum III (IIIa-IIIc) consists of imported fill material utilized for historic land reclamation. Stratum IV consists of a buried A horizon developed atop Jaucas sand and enriched with traditional Hawaiian and historic cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 20 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 20 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing early to mid-twentieth century artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass, ceramic, and metal fragments were dispersed within the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of cultural material and subsurface pit features (see below), and has been assigned SIHP # -7578.

Three pit features associated with Stratum II were observed within the east sidewall of TE 20 (SIHP # -7578, Features D, E, and F) (see Figure 89, Figure 91, and Table 30).

SIHP # -7578, Feature D, measures 30 cm across, and originates from the base of Stratum II and intrudes into Stratum Va. The feature is square in profile, 70 cm long and ranges from 60 to 130 cm below surface. No cultural material was observed within the feature. The function of this feature was not determined.

SIHP # -7578, Feature E originates from the base of Stratum II and intrudes into Stratum Va. The feature's shape is rectangular in profile, measures 30 cm across, and ranges from 60 to 120 cm below surface. A rectangular "2 by 4" wooden post remnant, set vertically, was observed within the feature. The wooden post measured approximately 5 cm (2 in) by 10 cm (4 in) by 30 cm (12 in). This feature is interpreted as a postmold.

SIHP # -7578, Feature F originates from the base of Stratum II and intrudes into Stratum Vb. The feature is funnel-shaped, measuring 110 cm across at the top, and tapers toward base. The feature ranges in depth from 60 to 150 cm below the existing surface. Two plastic toy cars, two glass bottles, and a 1948 plastic pocket calendar were observed and collected from the feature (see Section 5 Results of Laboratory Analysis). The function of this feature is unknown.

Table 29. Strata Observed at Test Excavation 20

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 7/3, very pale brown; coral base course; imported coral base course fill material associated with construction of existing asphalt surface
Ib	20-50	5YR 4/3, dark reddish brown; clay; structureless massive; moist very firm consistency; plastic; terrigenous origin; very abrupt lower boundary; smooth topography; imported clay fill material associated with construction of existing asphalt surface
II	40-70	10YR 3/2, very dark grayish brown; sandy loam; weak, fine, crumb; moist, friable consistency; non-plastic; mixed origin; clear lower boundary; irregular topography; contained charcoal flecking, metal, glass, and ceramic fragments. This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIIa	60-80	10YR 8/2, very pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIIb	80-90	10YR 7/1, light gray; clay; structureless, massive; moist firm consistency; slightly plastic; marine origin; very abrupt lower boundary; broken/discontinuous topography; imported marine dredge clay fill material. This stratum is associated with historic land reclamation.
IIIc	70-95	7.5YR 3/3, dark brown; silty loam; moderate, fine, blocky structure; moist, friable consistency; non-plastic; terrigenous origin; very abrupt lower boundary; broken/discontinuous topography; imported fill material associated with historic land reclamation
IV	90-100	10YR 3/1, very dark gray; loamy sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; broken/discontinuous topography; contained sparse marine shell midden, charcoal and one small red brick fragment (not collected); buried A horizon that developed atop Jaucas sand and is enriched with cultural material. This layer has been designated as a component of SIHP # -7580.
Va	110-130	2.5Y7/4, pale yellow; fine sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; natural Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Vb	130-160	10YR 7/3, very pale brown; sandy clay; structureless massive; wet sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine sandy clay atop limestone bedrock (Zone 1).

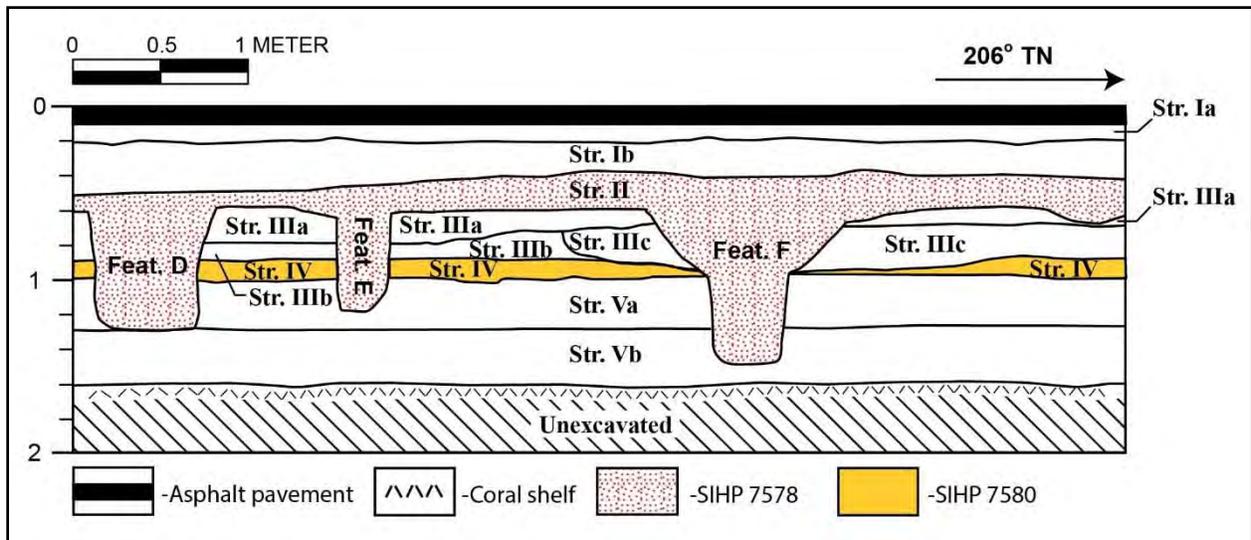


Figure 89. TE 20, stratigraphic profile of east sidewall



Figure 90. TE 20, photograph of east sidewall

Table 30. Pit Features Observed at TE 20

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	D	70 cm long	60-130	Mixture of Strata IIIa, IIIb, IV, and Va sediments	Square-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Va.	None observed	Unknown
-7578	E	30 cm diameter	60-120	Mixture of Strata IIIa, IIIb, IV, and Va sediments	Rectangular-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Va.	Rectangular 2 x 4 wooden post remnant set vertically observed within feature.	Postmold
-7578	F	110 cm long	60-150	Mixture of Strata IIIa, IIIc, IV, Va, and Vb sediments	Funnel-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Vb.	Two plastic toy cars, two glass bottles, and one plastic 1948 Chevron gas station calendar	Unknown

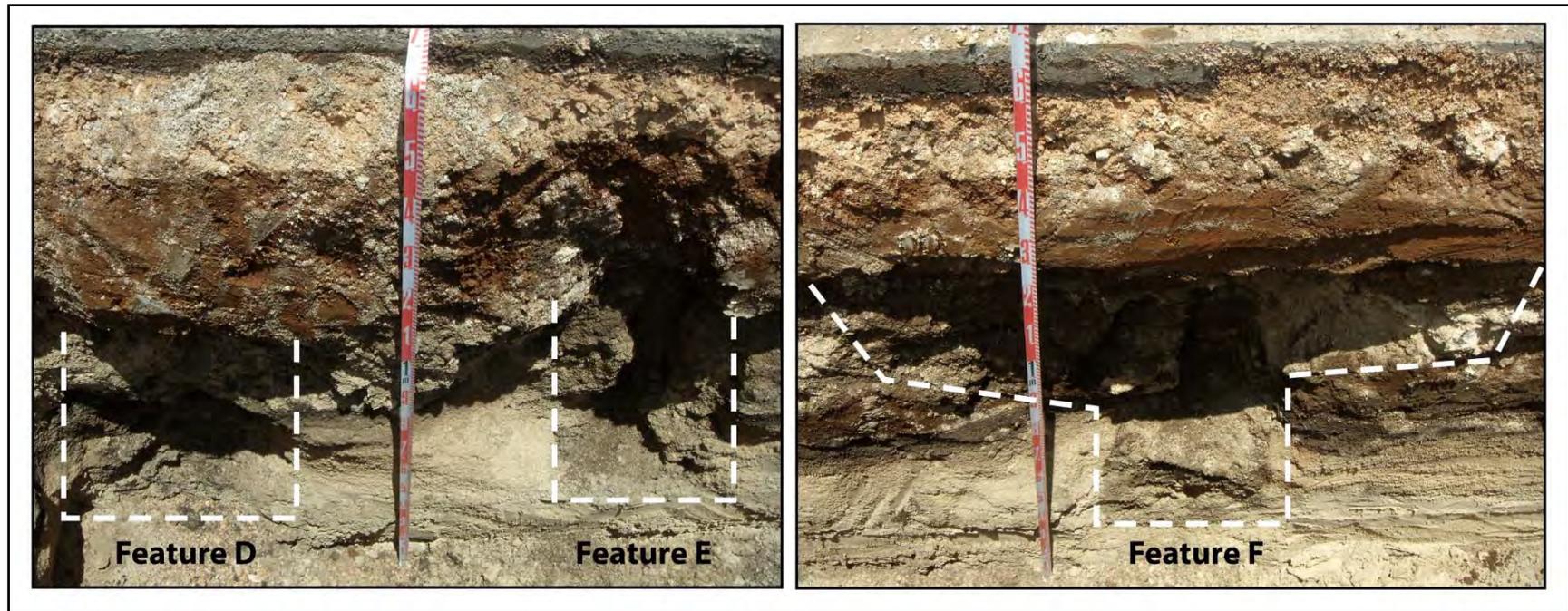


Figure 91. TE 20, photograph of SIHP # -7578, Features D, E, and F, view to east

Also of note is Stratum IV, a buried A horizon that developed atop Jaucas sand (Stratum Va) and enriched with cultural material. Sparse marine shell midden and charcoal were dispersed throughout the stratum (not collected). A red brick fragment was also observed. The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Stratum IV is considered a cultural layer based on the presence of cultural material, and has been designated as SIHP # -7580.

## 4.2.2.21 Test Excavation 21

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.9 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 21 (TE 21) (Table 31, Figure 92, and Figure 93) consists of imported fill (Stratum I and Stratum II) and naturally deposited sediments (Stratum III and Stratum IV). Stratum I consists of imported fill material utilized for construction of existing infrastructure (i.e., concrete floor of existing building). Stratum II (IIa-IIc) consists of imported fill material utilized for historic land reclamation. Stratum III (IIIa-IIIb) consists of naturally deposited sandy clay marine sediments indicating the former presence of a semi-marine environment (i.e., tidal flats; Zone 2). Stratum IV consists of anaerobic soils that developed while completely waterlogged, suggest the presence of a coastal lagoon environment prior to land reclamation.

TE 21 is of interest as the observed stratigraphy indicates the immediate area was once a transitional zone between tidal flats (Zone 2) and a coastal lagoon (Zone 3) (see Figure 37 and Figure 94). Stratum III consists of sandy clays (Stratum IIIa) and marine clays (Stratum IIIb) of varying depth that likely represent former dry and wet areas amidst the tidal flats (Zone 2). Abutting and slightly deeper than Stratum III are anaerobic soils developed in waterlogged conditions (Stratum IV) that represent the former presence of a coastal lagoon environment (Zone 3).

Excavation of TE 21 ceased at 1.9 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 31. Strata Observed at Test Excavation 21

Stratum	Depth (cmbs)	Description
N/A	0-20	Existing concrete slab
Ia	20-50	10 YR 3/2, very dark grayish brown; extremely gravelly silt loam; weak, fine, crumb structure; moist, very friable consistency; non-plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported basalt base course. This stratum is associated with construction of existing infrastructure (i.e., concrete floor of existing building).
Ib	60-100	10 YR 6/2, light brownish gray; gravelly sandy loam; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of existing infrastructure (i.e., concrete floor of existing building).
IIa	70-100	10 YR 3/2, very dark grayish brown; gravelly sandy loam, weak, fine, crumb structure; moist, friable consistency; non-plastic; terrigenous origin; abrupt lower boundary; broken/discontinuous topography. This stratum is associated with historic land reclamation activities.
IIb	100-180	10 YR 8/3, very pale brown; very stony medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; irregular topography; imported crushed coral and volcanic cinder fill material. This stratum is associated with historic land reclamation activities.
IIc	100-170	10 YR 5/3, brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; fill material consisting of marine sand and volcanic cinder. This stratum is associated with historic land reclamation activities.
IIIa	160-190	10 YR 8/2, very pale brown; sandy clay; structureless, massive; wet, very sticky consistency; plastic; marine origin; diffuse lower boundary; broken/discontinuous topography. This stratum is indicative of the semi-marine environment (i.e., tidal flats) that existed within the project area prior to historic land reclamation, tidal flats; Zone 2.
IIIb	180-190	GLEY 2 7/1, light bluish gray; sandy clay; structureless, massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine clay atop limestone bedrock (i.e., coral shelf); Zone 2.
IV	170-190	GLEY 2 5/4, greenish gray; sandy clay; structureless, massive; wet, slightly sticky consistency; non-plastic; marine origin; contains decomposing organics and naturally occurring marine bivalves. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation, Zone 3.

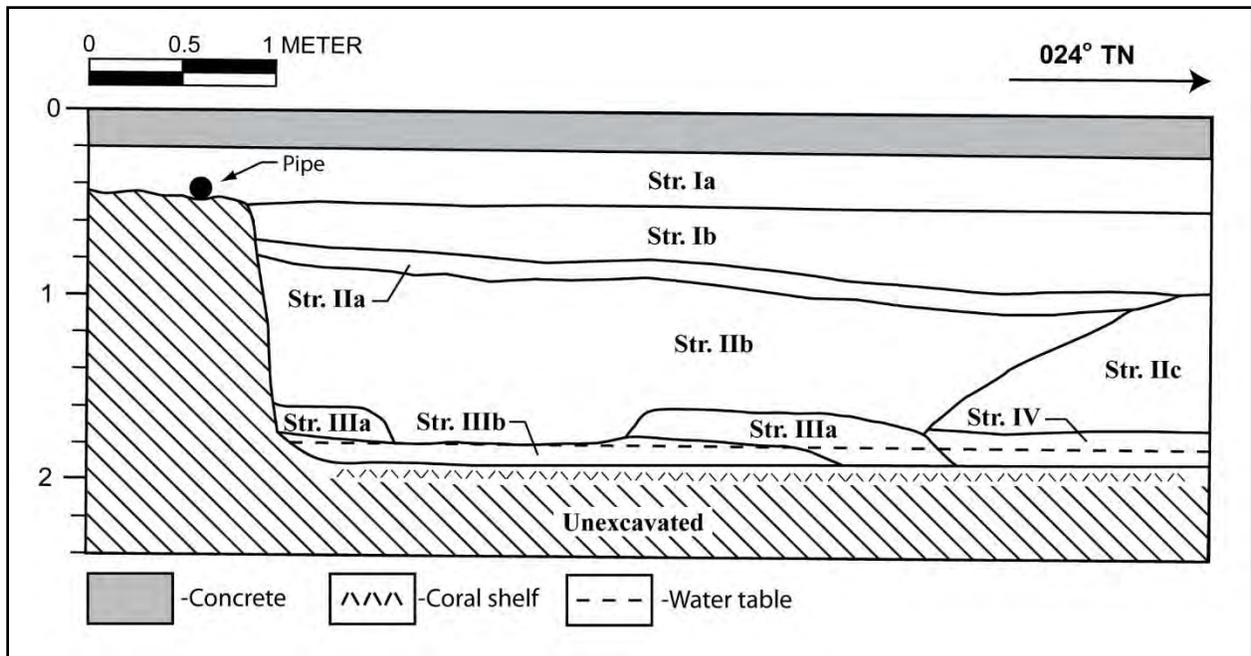


Figure 92. TE 21, stratigraphic profile of west sidewall



Figure 93. TE 21, photograph of west sidewall

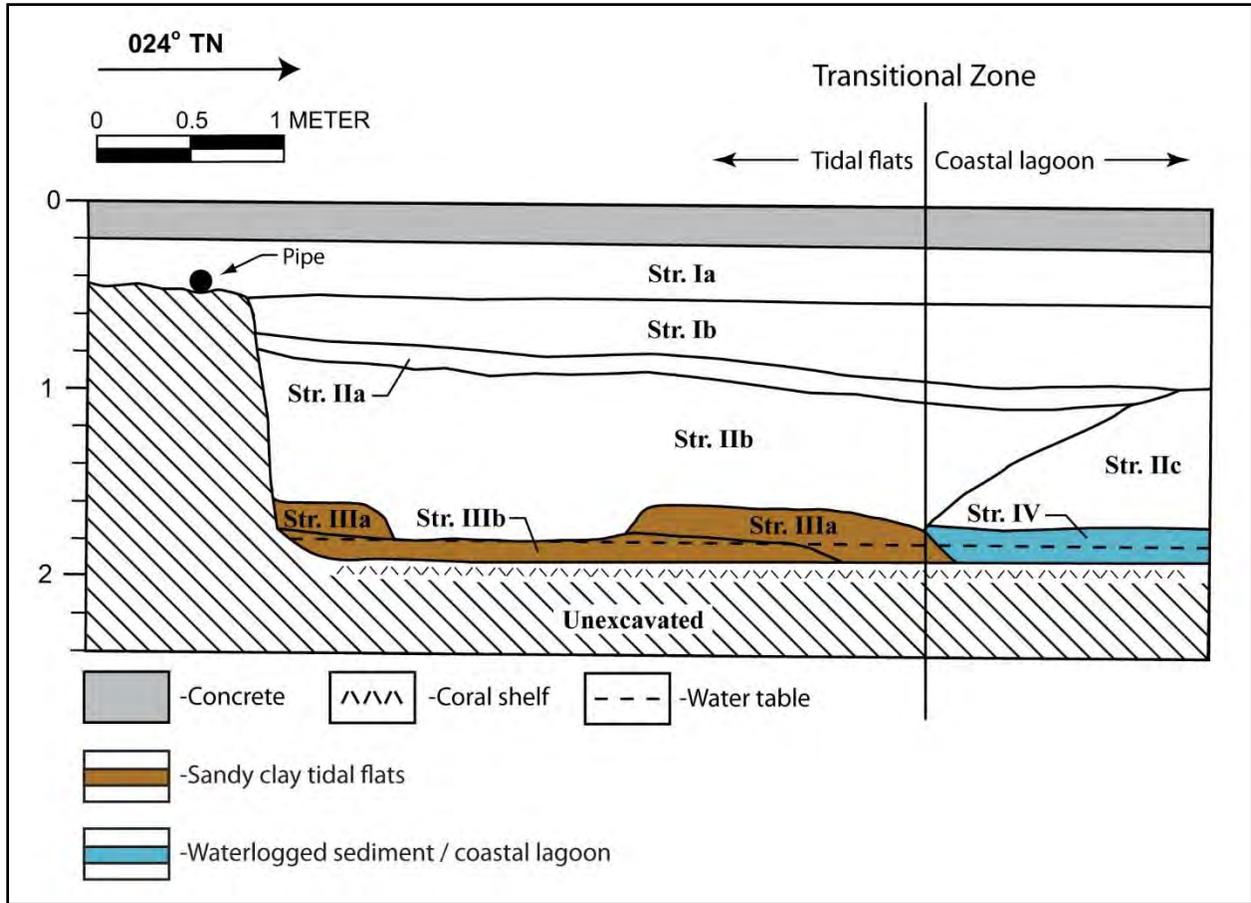


Figure 94. TE 21, stratigraphic profile of west sidewall, showing transition from tidal flats (Zone 2) to coastal lagoon (Zone 3)

## 4.2.2.22 Test Excavation 22

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 22 (TE 22) (Table 32, Figure 95, and Figure 96) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III), and naturally deposited sediments (Stratum IV and Stratum V). Stratum I consists of imported fill utilized for construction of the existing concrete surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of a culturally sterile A horizon that developed at the transitional zone between wet and dry environments. Stratum IV (IVa and IVb) consists of naturally deposited sandy clay indicative of a semi-marine environment (i.e., tidal flats; Zone 2). Stratum V consists of anaerobic soils that developed while completely waterlogged, suggesting the presence of a coastal lagoon environment (Zone 3) prior to land reclamation. Excavation of TE 22 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

TE 22 is of interest as the observed stratigraphy indicates the immediate area was once a transitional zone between wet and dry environments, with tidal flats and a sand dune formerly existing within the southern portion of the project area and a coastal lagoon within the northern portion (see Figure 37 and Figure 97). The presence of a buried, culturally sterile, sandy clay A horizon (i.e., former land surface) (Stratum III) at the horizontal interface with anaerobic soils developed in waterlogged conditions (Stratum V) indicates a likely transitional point between semi-marine and marine environments.

Table 32. Strata Observed at Test Excavation 22

Stratum	Depth (cmbs)	Description
N/A	0-10	Existing concrete slab
I	10-50	2.5 YR 3/2, dusky red; extremely gravelly silt loam; weak, fine, crumb structure; dry, weakly coherent consistency; non-plastic; terrigenous origin; very abrupt lower boundary; smooth topography; contained twine material; imported basalt base course material. This stratum is associated with construction of existing infrastructure (i.e., concrete floor of existing building).
II	40-160	2.5 YR 8/2, pale yellow, very cobbly medium sand; structureless, single-grain; dry, loose consistency; non-plastic; marine origin; clear lower boundary; irregular topography; imported fill material. This stratum is associated with historic land reclamation.
III	120-130	10 YR 6/3, pale brown; sandy clay; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; mixed origin; diffuse lower boundary; discontinuous topography; contains very sparse charcoal flecking; buried A horizon; culturally sterile.
IVa	115-160	2.5 Y 7/3; pale yellow; sandy clay; structureless, massive; moist, firm consistency; plastic; marine origin; diffuse lower boundary; broken/discontinuous topography; naturally deposited marine sediment; tidal flats; Zone 2.
IVb	140-175	2.5 Y 8/2; pale yellow; clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin. This stratum consists of marine clay sediment naturally deposited atop limestone bedrock (i.e., coral shelf), tidal flats; Zone 2.
V	160-180	GLEY 2 6/10B, bluish gray; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin. This stratum is indicative of the coastal lagoon environment that existed within the project area prior to historic land reclamation; Zone 3.

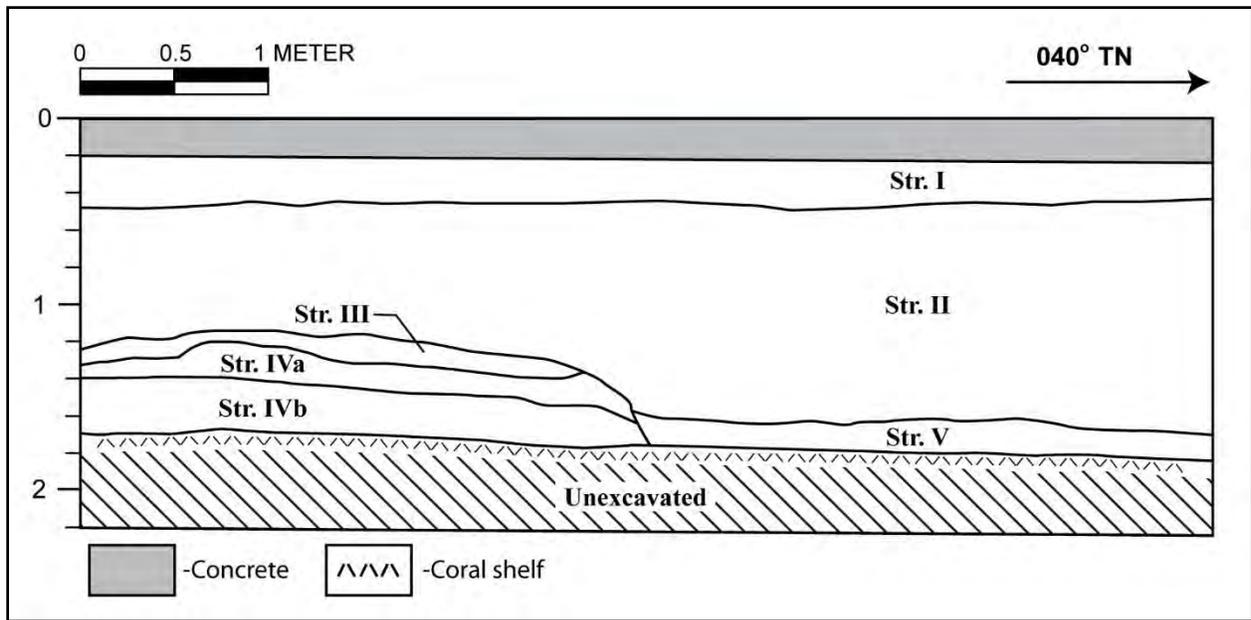


Figure 95. TE 22, stratigraphic profile of northwest sidewall



Figure 96. TE 22, photograph of northwest sidewall

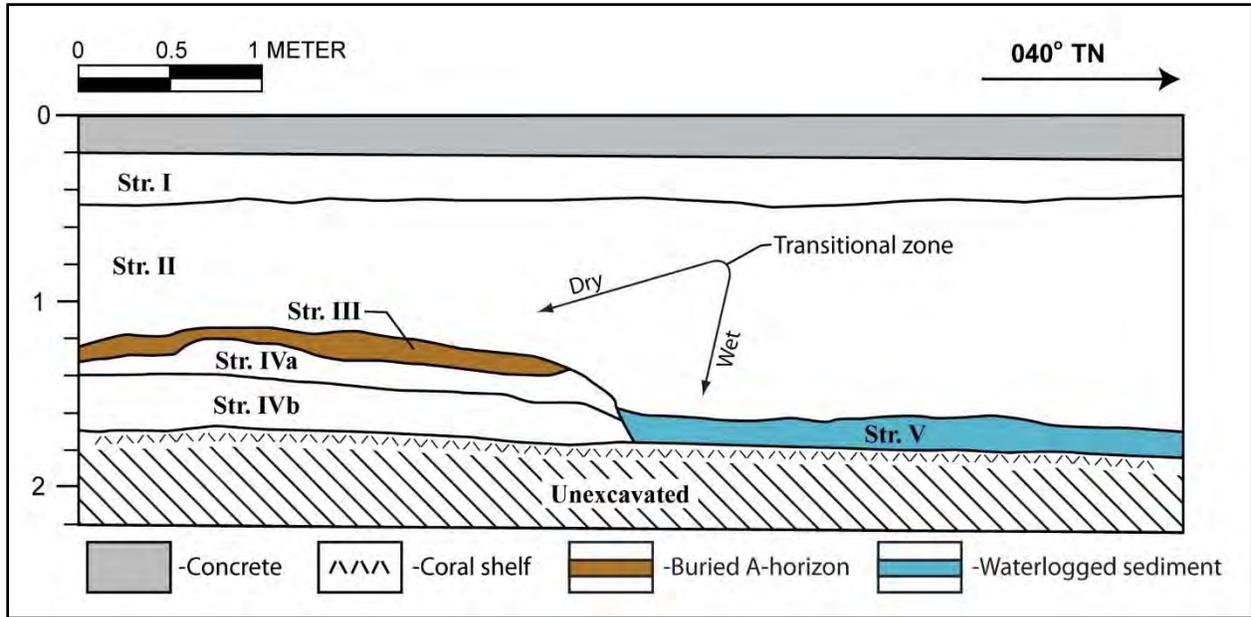


Figure 97. TE 22, stratigraphic profile of west sidewall, showing transition from dry tidal flats (Strata IVa-IVb; Zone 2) to waterlogged coastal lagoon sediments (Stratum IV; Zone 3)

## 4.2.2.23 Test Excavation 23

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	2.2 m
<b>Orientation:</b>	W/E

The stratigraphy of Test Excavation 23 (TE 23) (Table 33, Figure 98, and Figure 99) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sandy clay (Stratum III). Stratum I consists of imported fill associated with construction of the existing asphalt surface. Stratum II consists of imported fill associated with historic land reclamation. Stratum III consists of naturally deposited marine clay (Zone 3). Excavation of TE 23 ceased at 2.2 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).<sup>168</sup>,

Table 33. Strata Observed at Test Excavation 23

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
I	10-30	10YR 2/2, very dark brown; sandy loam; weak, fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material associated with existing asphalt surface
II	30-120	10YR 8/2, very pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	110-150	10YR 6/2, light brownish gray; sandy clay; structureless massive; moist, firm consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 3.

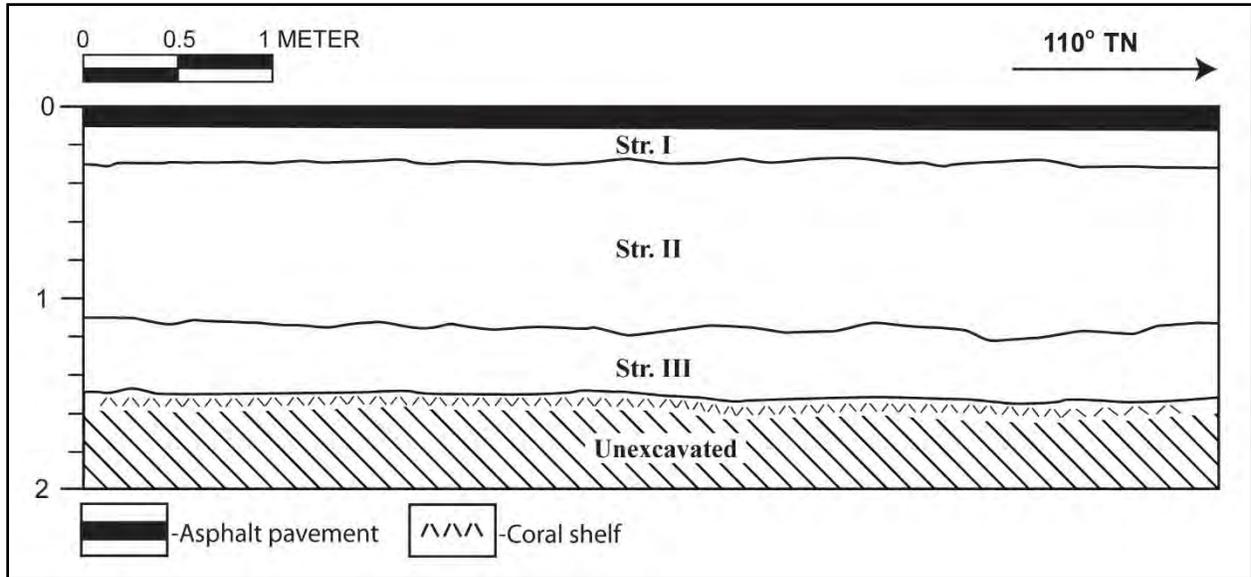


Figure 98. TE 23, stratigraphic profile of north sidewall



Figure 99. TE 23, photograph of north sidewall

## 4.2.2.24 Test Excavation 24

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.4 m
<b>Orientation:</b>	W/E

The stratigraphy of Test Excavation 25 (TE 25) (Table 34, Figure 100, and Figure 101) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sandy clay (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill associated with historic land reclamation. Stratum III consists of naturally deposited sediment indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 24 ceased at 1.4 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 34. Strata Observed at Test Excavation 24

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 7/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
Ib	20-25	2.5Y 3/2, very dark grayish brown; silty loam; moderate, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; common, fine roots; compacted import fill material associated with the construction of the existing asphalt paved parking lot
IIa	25-90	5Y 7/2, light gray; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	75-100	2.5Y 7/2, light gray; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; smooth topography; common, medium roots; imported marine dredge clay fill material associated with historic land reclamation.
IIIa	80-110	2.5Y 7/3, pale yellow; sandy clay; structureless massive; moist, friable consistency; slightly plastic; marine origin; diffuse lower boundary; smooth topography; common, medium roots; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation; tidal flats; Zone 2.
IIIb	110-140	2.5Y 8/2, pale yellow; clay; structureless massive; moist firm; plastic; marine origin. This stratum consists of naturally deposited marine clay sediment atop limestone bedrock; Zone 2.

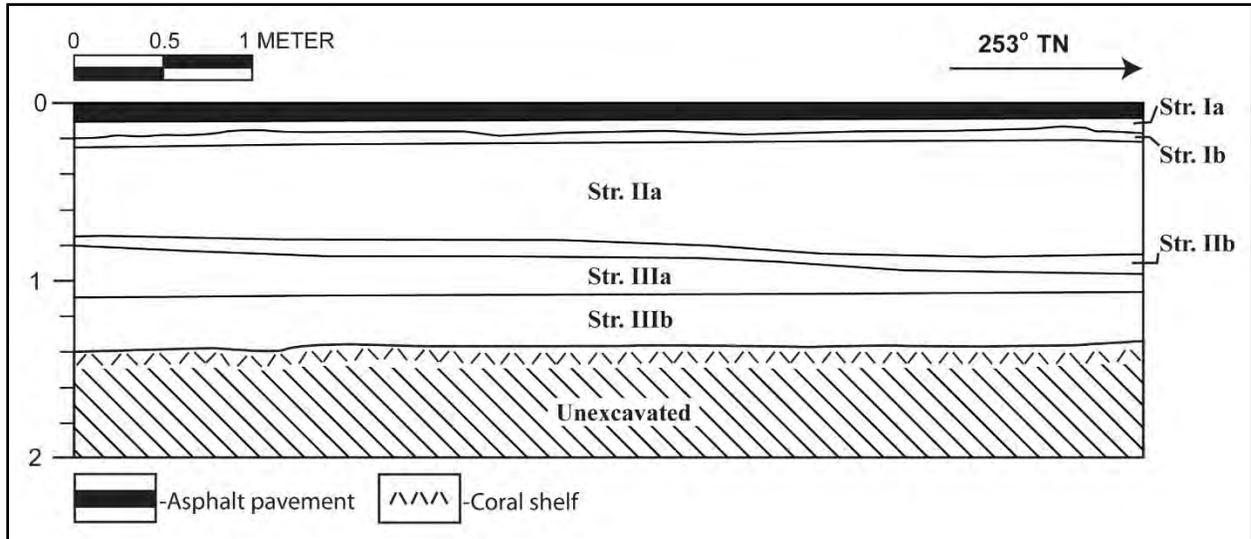


Figure 100. TE 24, stratigraphic profile of south sidewall



Figure 101. TE 24, photograph of south sidewall

## 4.2.2.25 Test Excavation 25

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 25 (TE 25) (Table 35, Figure 102, and Figure 103) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic land reclamation fill (Stratum III), and naturally deposited sediment (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 25 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

One pit feature (SIHP # -7578, Feature G), which postdates the crushed coral pavement (Feature P), was observed cutting through Stratum II and intruding into Stratum III (Figure 102, Figure 103, and Table 36). This feature was observed within the northwest sidewall of TE 25. It measured 190 cm long by 80+ cm wide, and extended from 40 to 140 cm below the existing surface. The feature contained a complete, fully articulated horse skeleton. During documentation of the horse burial a single isolated human molar was identified. This prompted the complete excavation of the horse burial to determine if additional human remains were present. Further exploration identified a possible cranial fragment in addition to the molar. The human remains (SIHP # -7582) were isolated to the pit fill of SIHP # -7578, Feature G. It was determined the human remains were associated with the imported historic land reclamation fill and that the human remains were within a secondary burial context. Following the documentation of TE 25, the human remains were wrapped in muslin and placed in a small *lauhala* basket. The basket was then filled with clean sand and returned to the approximate location where the human molar was first identified. The excavation was then backfilled, with a small plywood board placed atop the *lauhala* basket for added protection and to act as a marker if the need arises to relocate the remains (see Figure 102).

Table 35. Strata Observed at Test Excavation 25

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
I	10-40	10YR 3/2, very dark grayish brown; extremely gravelly silt loam; weak, very fine structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with construction of the existing asphalt surface.
II	40-50	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
III	50-140	7.5YR 4/1, dark gray; cobbly medium sand; structureless single-grain; dry, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; large coral boulders observed throughout the stratum; imported mixture of crushed coral and volcanic cinder fill associated with historic land reclamation.
IV	140-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, tidal flats; Zone 2.

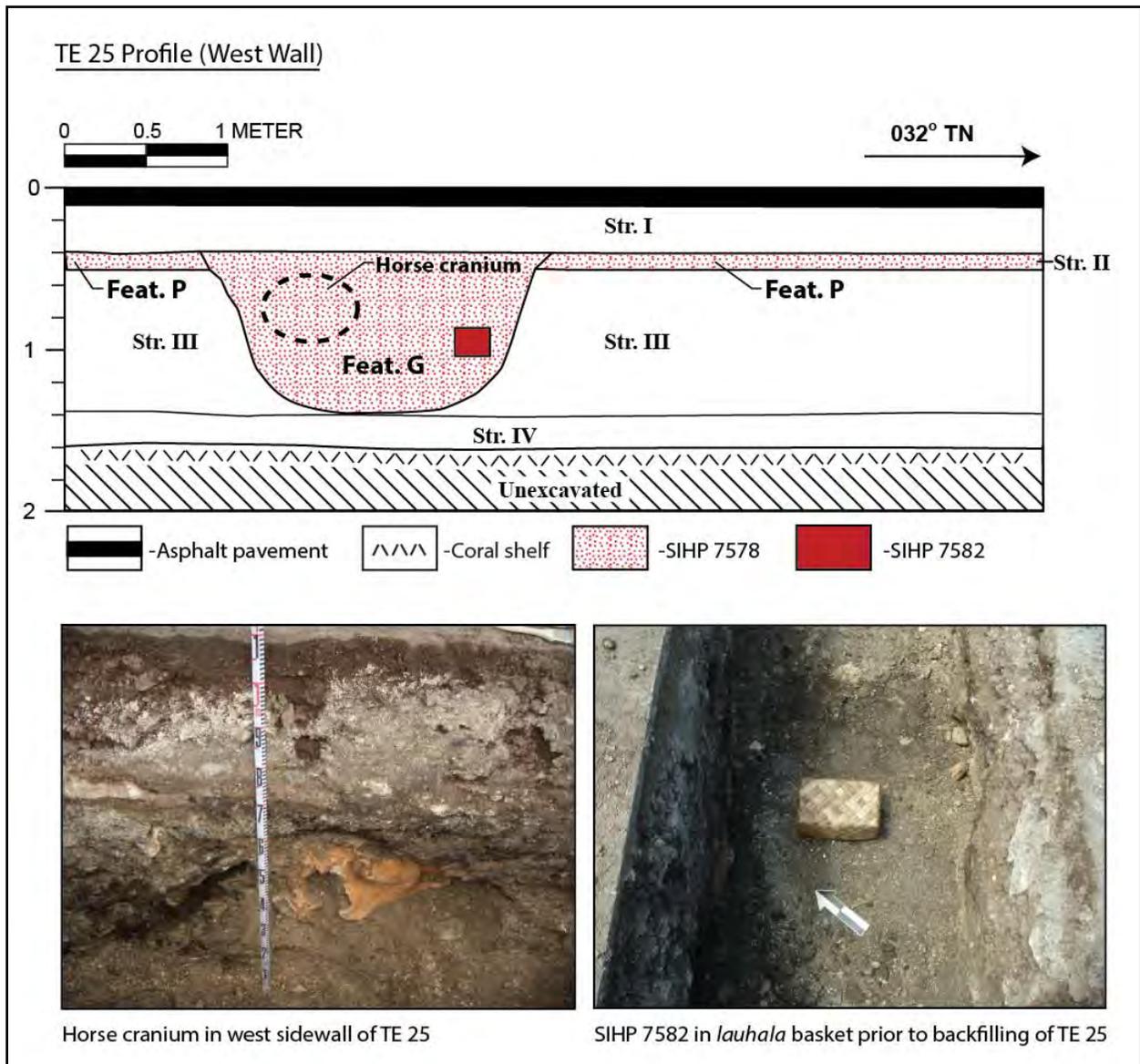


Figure 102. TE 25, stratigraphic profile of northwest sidewall



Figure 103. TE 25, photograph of northwest sidewall

Table 36. Pit Features Observed at TE 25

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	G	190 cm long by 80+ cm wide	40-140	Mixture of Strata II and III sediments	Bowl-shaped pit feature observed within the northwest sidewall of TE 25.  The upper portion of the feature is truncated by Stratum I. Pit feature cuts through Stratum II and intrudes into Stratum III.	Complete, fully articulated horse burial, an isolated human tooth, and a human cranial fragment	Horse burial and secondary isolated human remains

## 4.2.2.26 Test Excavation 25A

<b>Length:</b>	6 m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 25A (TE 25A) (Table 37, Figure 104, and Figure 105) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic land reclamation fill (Stratum III), and naturally deposited sediment (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation. Excavation of TE 25A ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

One pit feature of unknown function (SIHP # -7578, Feature I) was observed cutting through Stratum II and intruding into Stratum III (see Figure 104, Figure 106, and Table 38). This feature was observed within the northwest sidewall of TE 25. It measured 120 cm across in profile and extended from 40 to 70 cm below the existing surface. The feature was excavated out of the sidewall to better define its contents and function. Observed cultural materials included charcoal, saw-cut faunal bone, and glass, metal, and red brick fragments. All cultural material was noted, but not collected.

Table 37. Strata Observed at Test Excavation 25A

Stratum	Depth (cmbs)	Description
N/A	0-5	Asphalt
I	10-30	10YR 3/2, very dark grayish brown; extremely gravelly silty loam; weak, very fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported basalt base course. This stratum is associated with construction of the existing asphalt surface.
II	30-40	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
III	40-140	7.5YR 4/1, dark gray; sand fine to medium grain; structureless single-grain; dry loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported mixture of crushed coral and volcanic cinder fill materials associated with historic land reclamation
IV	140-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, tidal flats; Zone 2.

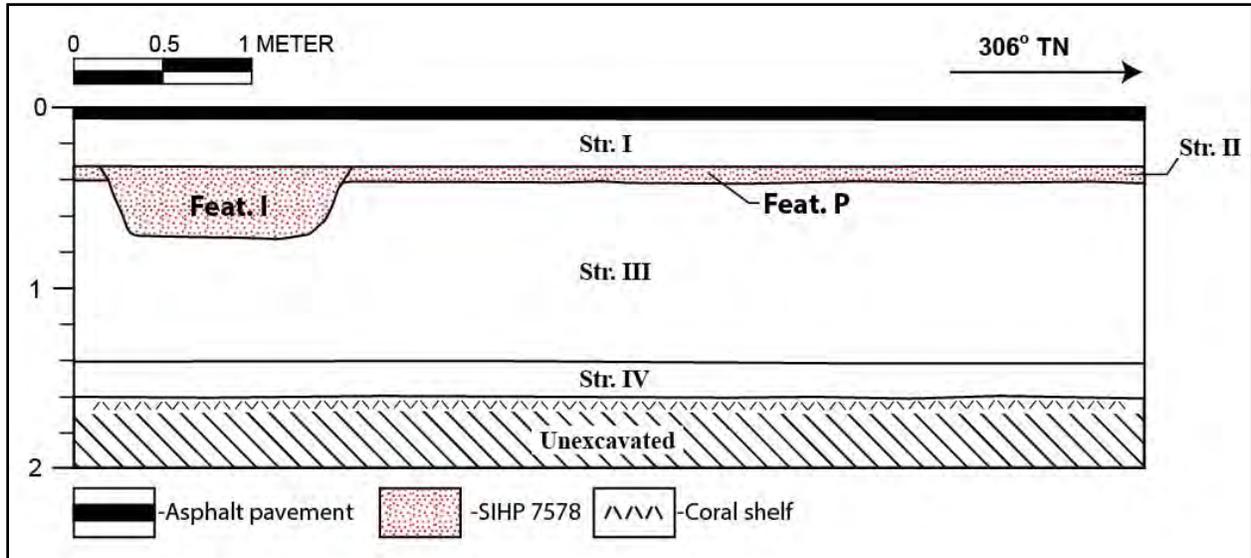


Figure 104. TE 25A, stratigraphic profile of southwest sidewall



Figure 105. TE 25A, photograph of southwest sidewall

Table 38. Pit Features Observed at TE 25A

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	I	120 cm long	30-70	Mixture of Strata II and III sediments	Bowl-shaped pit feature within southwest sidewall of TE 25A.  The upper boundary of the feature has been truncated by Stratum I. The feature intrudes through Stratum II and into Stratum III.	Charcoal, glass, metal, red brick, saw-cut faunal bone	Unknown

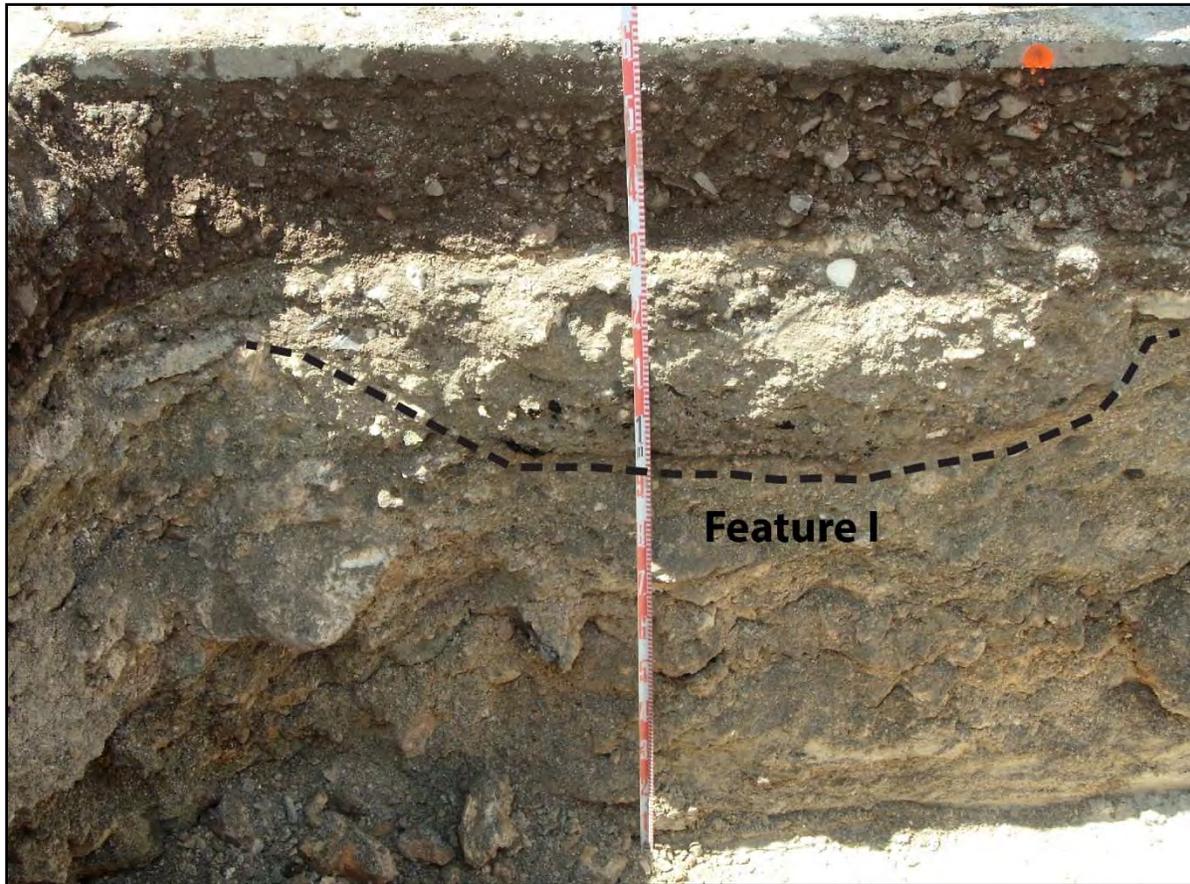


Figure 106. SIHP # -7578 Feature I within southwest sidewall of TE 25A

## 4.2.2.27 Test Excavation 25B

<b>Length:</b>	6 m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 25B (TE 25B) (Table 39, Figure 107, and Figure 108) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic land reclamation fill (Stratum III), and naturally deposited sediment (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 25B ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

Table 39. Strata Observed at Test Excavation 25B

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-5	Asphalt
I	10-30	10YR 3/2, very dark grayish brown; extremely gravelly silty loam; weak, very fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported basalt base course. This stratum is associated with construction of existing asphalt surface.
II	30-40	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # - 7578.
III	40-130	2.5Y 6/3, light yellowish brown; medium grain; structureless single-grain; dry loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; large coral boulders observed throughout the stratum; imported mixture of crushed coral and volcanic cinder fill associated with historic land reclamation
IV	120-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation; tidal flats, Zone 2.

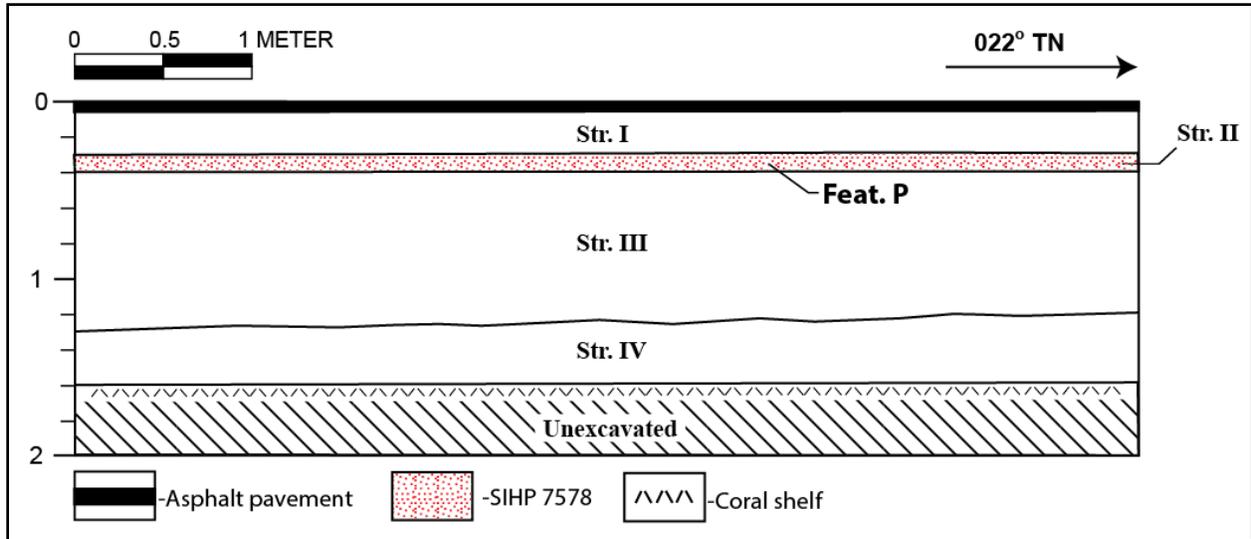


Figure 107. TE 25B, stratigraphic profile of northwest sidewall



Figure 108. TE 25B, photograph of northwest sidewall

## 4.2.2.28 Test Excavation 25C

<b>Length:</b>	6 m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 25C (TE 25C) (Table 40, Figure 109, and Figure 110) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic land reclamation fill (Stratum III), and naturally deposited sediment (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 25C ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P as a component of SIHP # -7578.

One pit feature of unknown function (SIHP # -7578, Feature J) was observed cutting through Stratum II and intruding into Stratum III (see Figure 109, Figure 110, Figure 111, and Table 41). This feature was observed within the northeast sidewall of TE 25 and in plan view. It measured 100 cm across and extended from 30 to 60 cm below the existing surface. The feature was completely excavated to better define its contents and function. Observed cultural materials included a glass bottle, glass fragments, a fork, metal fragments, slag, saw cut faunal bone, and charcoal. All cultural material was noted, but not collected.

Table 40. Strata Observed at Test Excavation 25C

Stratum	Depth (cmbs)	Description
N/A	0-5	Asphalt
I	5-30	10YR 3/2, very dark grayish brown; extremely gravelly silty loam; weak, very fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported basalt base course. This stratum is associated with construction of existing asphalt surface.
II	30-40	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported and highly compacted crushed coral fill material. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
III	40-130	10YR 8/2, very pale brown; very cobbly medium grain; structureless single-grain; dry loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported mixture of crushed coral and volcanic cinder fill materials associated with historic land reclamation.
IV	130-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation; tidal flats; Zone 2.

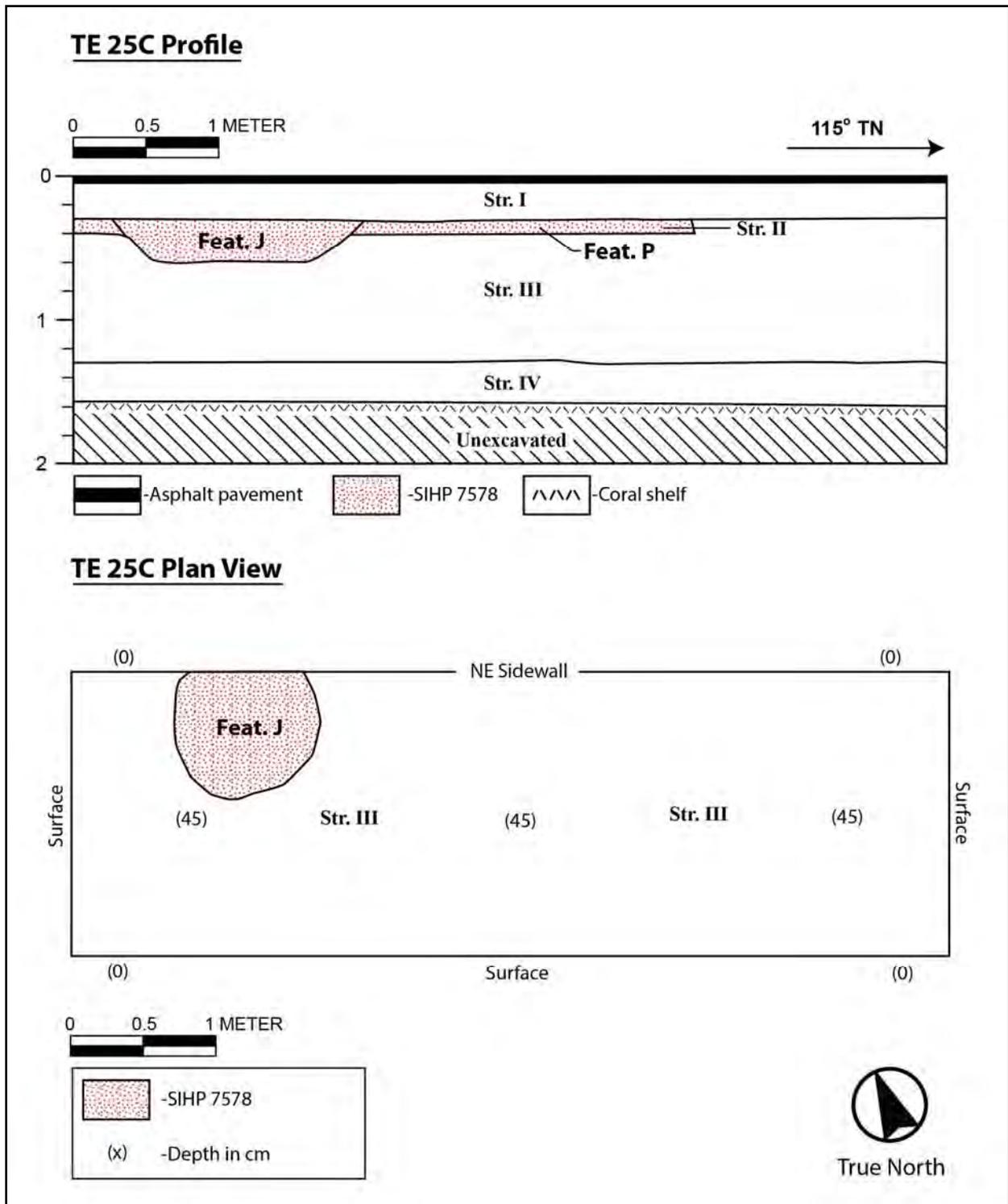


Figure 109. TE 25C stratigraphic profile of northeast sidewall (top) and plan view (bottom)



Figure 110. TE 25C, photograph of northeast sidewall



Figure 111. TE 25C, SIHP # -7578 Feature J (trash pit), plan view

Table 41. Pit Features Observed at TE 25C

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	J	100 cm long	30-60	Mixture of Strata II and III sediments	Circular-shaped pit feature observed in the northeast sidewall of TE 25C and in plan view.  The upper boundary of the feature has been truncated by Stratum I. The feature intrudes through Stratum II and into Stratum III.	A glass bottle, glass fragments, a fork, metal fragments, slag, saw-cut faunal bone, and charcoal	Unknown

## 4.2.2.29 Test Excavation 25D

<b>Length:</b>	6 m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 25D (TE 25D) (Table 42, Figure 112, and Figure 113) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic land reclamation fill (Stratum III), and naturally deposited sediment (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill material utilized for historic land reclamation. Stratum IV consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Excavation of TE 25D ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

Table 42. Strata Observed at Test Excavation 25D

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-5	Asphalt
I	5-30	10YR 3/2, very dark grayish brown; extremely gravelly silty loam; weak, very fine, crumb structure; moist, very friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported basalt base course. This stratum is associated with construction of the existing asphalt surface.
II	30-40	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported and highly compacted crushed coral fill material. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
III	40-140	10YR 8/2, very pale brown; very cobbly medium grain; structureless single-grain; dry loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; large coral boulders observed throughout the stratum; imported mixture of crushed coral and volcanic cinder fill materials associated with historic land reclamation.
IV	140-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; wet, slightly sticky consistency; plastic; marine origin; naturally deposited marine sediment. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation; tidal flats, Zone 2.

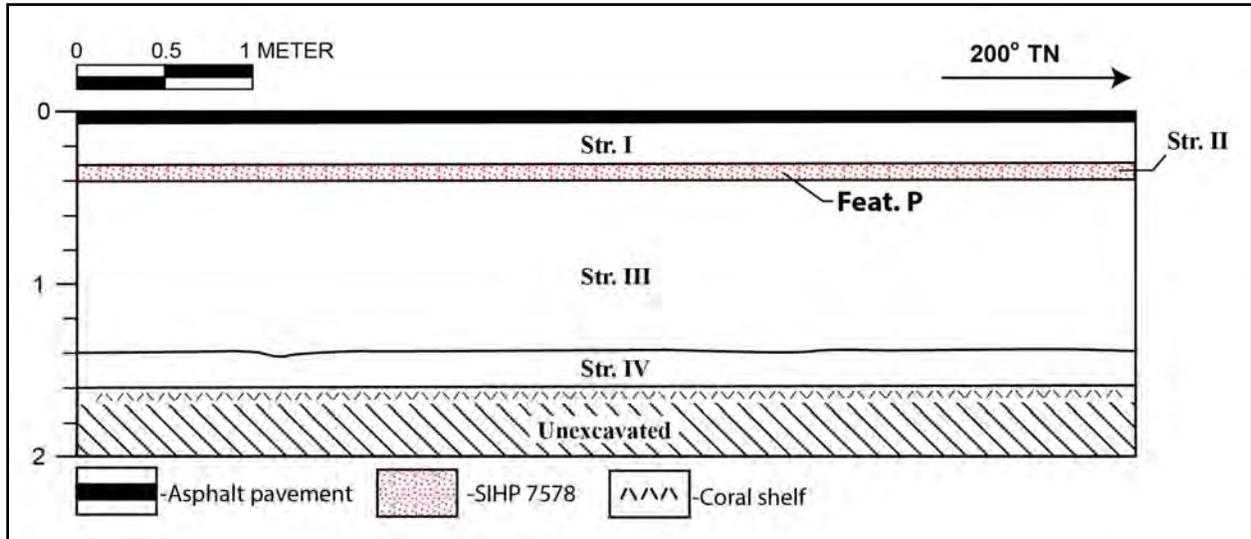


Figure 112. TE 25D, stratigraphic profile of southeast sidewall



Figure 113. TE 25D, photograph of southeast sidewall

## 4.2.2.30 Test Excavation 26

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.9 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 26 (TE 26) (Table 43, Figure 114, and Figure 115) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sediments (Stratum III). Stratum I consists of imported fill associated with construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill associated with historic land reclamation. Stratum III consists of naturally deposited Jaucas sand (IIIa) atop naturally deposited marine clay (IIIb). This stratum represents the presence of an elevated sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 26 ceased at 1.9 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 43. Strata Observed at Test Excavation 26

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
I	10-40	5YR 3/2, dark reddish brown; extremely gravelly silt loam; weak, very fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with construction of the existing asphalt paved parking lot.
IIa	40-130	10YR 7/1, light gray, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	60-80	10YR 6/1, gray; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; broken/discontinuous topography; imported marine dredge material. This layer is associated with historic land reclamation.
IIIa	80-120	10YR 7/3, very pale brown; loamy sand; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; marine origin; diffuse lower boundary; broken/discontinuous topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation (Zone 1).
IIIb	120-165	10YR 7/2, light gray; clay; structureless massive; wet sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock (Zone 1).

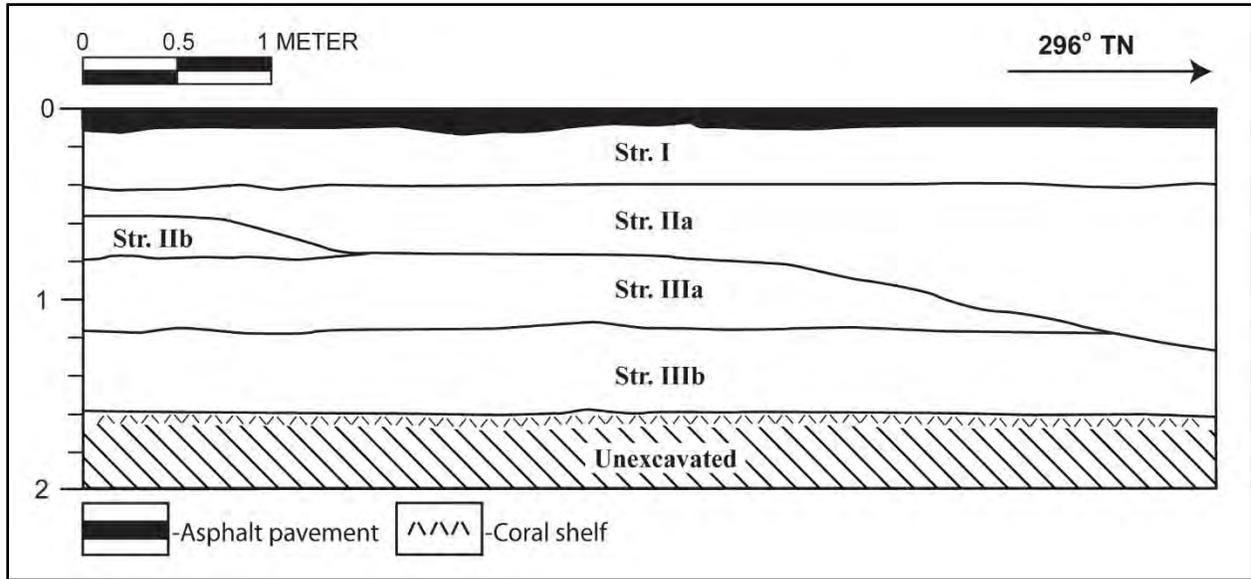


Figure 114. TE 26, stratigraphic profile of south sidewall



Figure 115. TE 26, photograph of south sidewall

## 4.2.2.31 Test Excavation 27

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	2.1 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 27 (TE 27) (Table 44, Figure 116, and Figure 117) consists of imported fill layers (Stratum I and Stratum II) overlying naturally deposited sediments clay (Stratum III and Stratum IV). Stratum I (Ia-Ib) consists of imported fill associated with construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill associated with historic land reclamation. Stratum III consists of naturally deposited sandy clay indicative of the semi-marine environment (i.e., tidal flats; Zone 2) that existed throughout the area prior to historic land reclamation. Stratum IV consists of anaerobic soils developed in waterlogged conditions (Zone 3). Excavation of TE 27 ceased at 2.1 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

TE 27 is of interest as the observed stratigraphy indicates the immediate area was once a transitional zone between wet and dry environments, with tidal flats and a sand dune formerly existing within the southern portion of the project area and a coastal lagoon within the northern portion (see Figure 37). Stratum III consists of naturally deposited sandy clay that likely represents a former semi-marine environment (i.e., tidal flats; Zone 2) that separated the dry sand dune and wet lagoonal environment to the north. The presence of anaerobic soils (Stratum IV) in the northern end of the test excavation represents the southern edge of a coastal lagoon (Zone 3) once present within the project area.

Table 44. Strata Observed at Test Excavation 27

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	5YR 3/4, dark reddish brown; extremely gravelly silt loam; weak, very fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with the construction of the existing asphalt paved parking lot.
Ib	20-50	10YR 6/2, light brownish gray; silty sand; structureless single-grain; moist loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill originally utilized for historic land reclamation, but has been reworked (i.e., mixed and graded) during existing parking lot construction
IIa	50-90	10YR 8/2, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIb	90-110	10YR 8/1, white; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; broken/discontinuous topography; imported marine dredge clay material associated with historic land reclamation
III	100-150	10YR 7/3, very pale brown; sandy clay; structureless massive; moist firm consistency; slightly plastic; marine origin; diffuse lower boundary; broken/discontinuous topography. This layer is indicative of the semi-marine environment (i.e., tidal flats) that existed throughout the area prior to historic land reclamation, tidal flats; Zone 2.
IV	120-165	GLE Y 1 7/5GY, light greenish gray; clay; structureless massive; wet, sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, coastal lagoon; Zone 3.

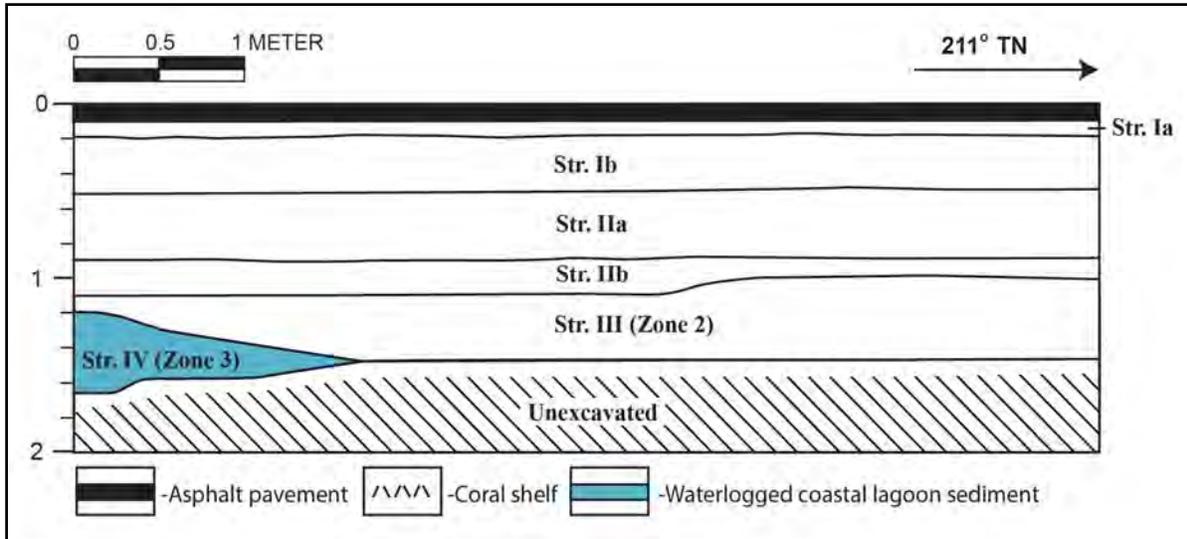


Figure 116. TE 27, stratigraphic profile of southeast sidewall, showing transition from dry tidal flats (Stratum III, Zone 2) to waterlogged coastal lagoon sediments (Stratum IV; Zone 3)



Figure 117. TE 27, photograph of southeast sidewall

## 4.2.2.32 Test Excavation 28

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.4 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 28 (TE 28) (Table 45 and Figure 118) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum II), historic fill (Stratum III), a culturally sterile A horizon (Stratum IV), and naturally deposited sediments (Strata V and VI). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a culturally enriched buried A horizon that developed atop imported historic land reclamation fill. Stratum III (IIIa-IIIb) consists of imported fill material associated with historic land reclamation. Stratum IV consists of a culturally sterile A horizon that developed atop naturally deposited Jaucas sand. Stratum V consists of Jaucas sand (Stratum Va) and marine sandy clay (Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 28 indicates the presence of an elevated sand dune amidst (Zone 1) the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 28 ceased at 1.4 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon containing historic artifacts atop deposited historic land reclamation fill sediments (Stratum III). Sparse glass, ceramic, and metal fragments were observed (not collected) within the stratum. Charcoal flecking was also observed. Stratum II is considered a cultural layer based on the presence of cultural material and a subsurface pit feature (see below), and has been designated as SIHP # -7578.

One pit feature (SIHP # -7578, Feature H) was observed to be associated with Stratum II (SIHP # -7578) within TE 28 (see Table 46 and Figure 118). SIHP # -7578, Feature H consists of a large bowl-shaped pit feature observed within the southwest sidewall of TE 28. The feature originates from Stratum II and intrudes into Stratum IIIa. It measures approximately 400 cm long and 80+ cm wide and extended from 25 to 75 cm below the existing surface. The entire feature was excavated out of the sidewall in an attempt to identify cultural content and to determine feature function. A 5-gallon sample was excavated and screened from the feature fill. Identified cultural materials included pig bones, charcoal, charred water-rounded basalt cobbles, and a glass milk bottle (likely intrusive). All cultural material was collected except the basalt cobbles, which were noted and photographed (see Figure 118) (see Section 5 Results of Laboratory Analysis). Based on its size, shape, and cultural content, SIHP # -7578, Feature H is interpreted as a fire pit utilized for food preparation.

Table 45. Strata Observed at Test Excavation 28

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/3, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt paved parking lot.
Ib	20-30	7.5YR 2.5/2, very dark brown; loam; weak, fine, crumb structure; moist friable; non-plastic; mixed origin; clear lower boundary; smooth topography; imported fill material associated with construction of the existing asphalt paved parking lot.
II	20-75	2.5Y 4/2, dark grayish brown; silty loam; weak, fine, granular structure; moist, very friable consistency; non-plastic; mixed origin; clear lower boundary; irregular topography; contained charred basalt cobbles, historic glass, pig remains, and charcoal (all collected except basalt). This stratum is identified as a cultural layer and has been designated as a component of SIHP # -7578.
IIIa	25-90	10YR 8/2, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIIb	70-90	10YR 8/1, white; clay; structure less massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; smooth topography; imported marine dredge clay material. This layer is associated with historic land reclamation.
IV	85-110	2.5Y 4/3, olive brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon; no cultural material observed
Va	95-125	10YR 8/4, very pale brown; sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	120-145	10YR 7/2, light gray; sandy clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

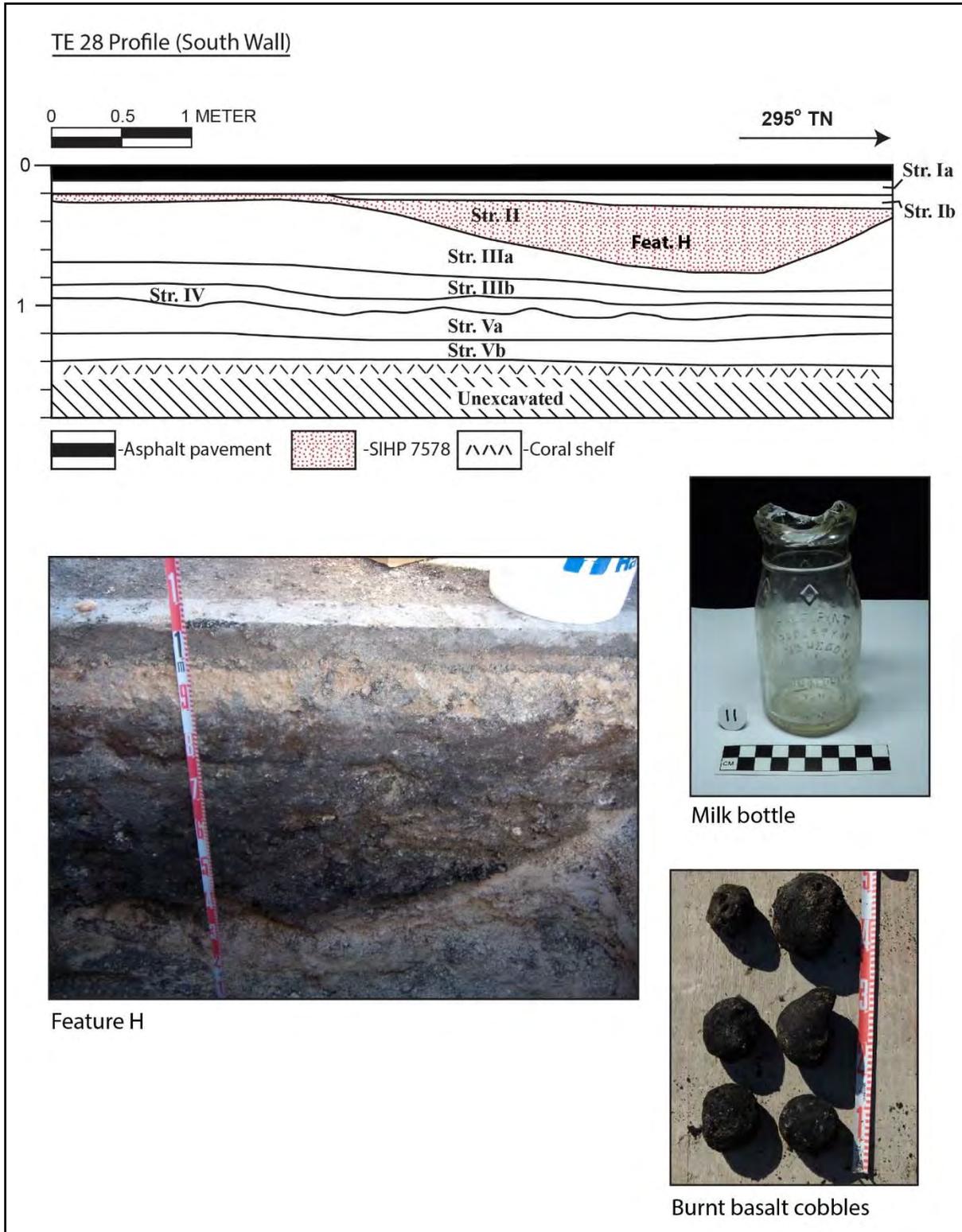


Figure 118. TE 28, stratigraphic profile, photograph of southwest sidewall, and contents of SIHP # -7578 Feature H

Table 46. Pit Features Observed at TE 28

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	H	400 cm long by 80+ cm wide	25-75	Mixture of Strata II and IIIa sediments	Large bowl-shaped pit feature observed in the southwest sidewall of TE 28 Feature originates in Stratum II and intrudes into Stratum IIIa.	Pig bones, charcoal, burnt basalt cobbles, and a glass bottle	Fire pit/Food preparation

## 4.2.2.33 Test Excavation 29

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 29 (TE 29) (Table 47, Figure 119, and Figure 120) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III), and naturally deposited sediments (Stratum IV and V). Stratum I consists of imported fill associated with construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill associated with historic land reclamation. Stratum III consists of a buried, culturally sterile A horizon that developed atop naturally deposited sediments. Stratum IV consists of naturally deposited Jaucas sand (IIIa) atop naturally deposited marine clay (IIIb). This stratum represents the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 29 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 47. Strata Observed at Test Excavation 29

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
I	10-30	10YR 4/2, dark grayish brown; extremely gravelly silt loam; weak, very fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with construction of the existing asphalt paved parking lot.
IIa	30-120	2.5Y 7/2, light gray; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	75-110	10YR 7/2, light gray; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; smooth topography; imported marine dredge clay material associated with historic land reclamation
III	90-100	10YR 4/2, dark grayish brown; silty sand; structureless single-grain; moist loose consistency; non-plastic; mixed origin; diffuse lower boundary; broken/discontinuous topography; truncated buried A horizon; no cultural material observed
IVa	100-130	10YR 8/4, very pale brown; sand; structureless single-grain; moist loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	120-160	2.5Y 7/2, light gray; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

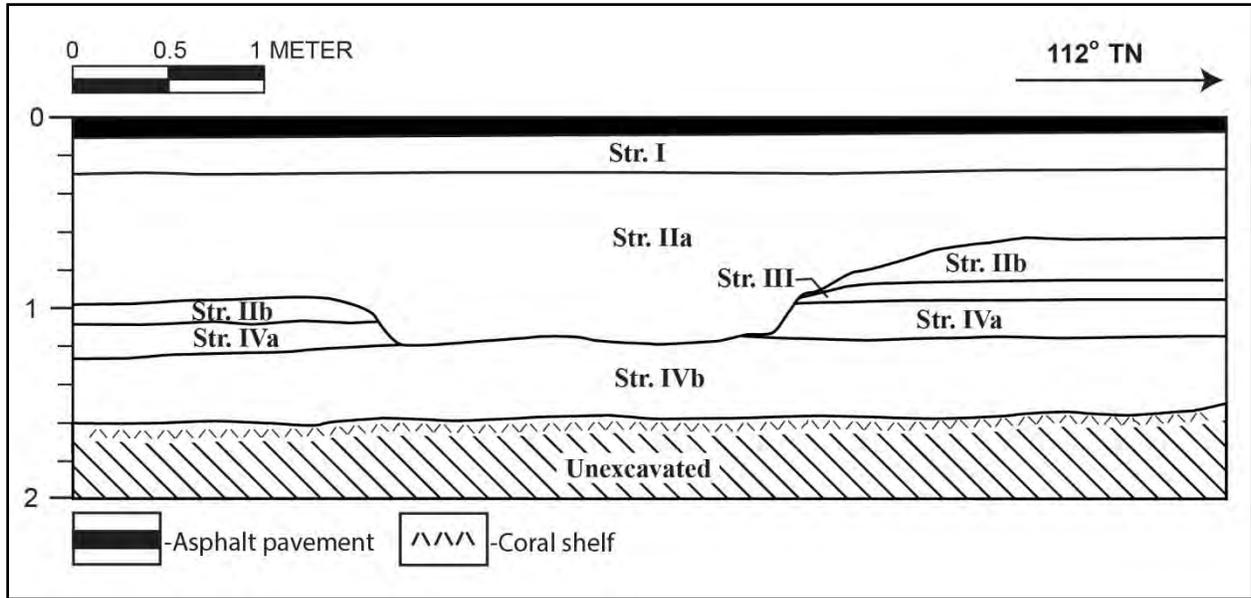


Figure 119. TE 29, stratigraphic profile of northeast sidewall



Figure 120. TE 29, photograph of northeast sidewall

## 4.2.2.34 Test Excavation 30

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.75m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 30 (TE 30) (Table 48, Figure 121, and Figure 122) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III), and naturally deposited sediments (IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Stratum III consists of a truncated, culturally sterile A horizon that developed atop naturally deposited Jaucas sand (Stratum IVa), and has been truncated by grading. Stratum IV consists of Jaucas sand (Stratum IVa) and marine sandy clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 30 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 30 ceased at 1.75 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 48. Strata Observed at Test Excavation 30

Stratum	Depth (cmbs)	Description
I	0-40	5YR 3/4, dark reddish brown; extremely gravelly silt loam; weak, very fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with construction of the existing asphalt surface.
IIa	40-80	10YR 6/2, light brownish gray, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	80-90	10YR 7/2, light gray; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; smooth topography; imported marine dredge clay material associated with historic land reclamation.
III	90-100	10YR 5/4, yellowish brown; silty sand; structureless single-grain; moist loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon; no cultural material observed
IV	100-130	10YR 7/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
V	130-160	10YR 8/3, very pale brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

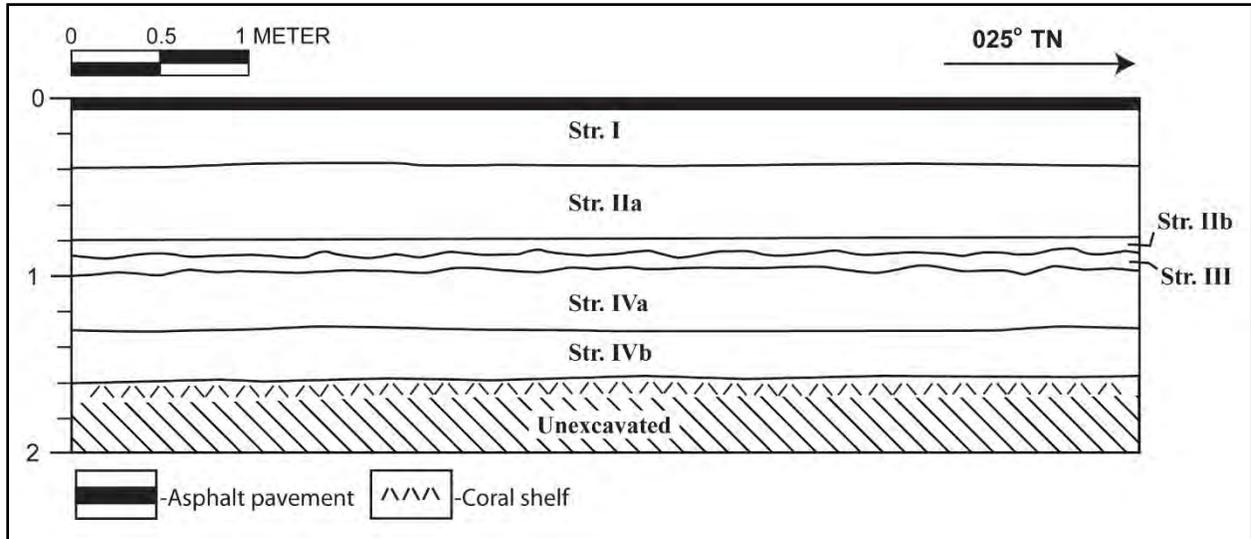


Figure 121. TE 30, stratigraphic profile of northwest sidewall



Figure 122. TE 30, photograph of northwest sidewall

## 4.2.2.35 Test Excavation 31

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.8 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 31 (TE 31) (Table 49, Figure 123, and Figure 124) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III) and naturally deposited sediments (Stratum IV). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried, culturally sterile A horizon that developed atop Jaucas sand (Stratum IVa) and has been truncated by grading. Given its smooth lower topography and the lack of cultural material within it, Stratum III does not appear to be related to SIHP # -7578. Stratum III likely reflects the natural soil accumulation atop the Jaucas sand (Stratum IV) prior to the deposition of the crushed coral fill (Stratum II). Stratum IV consists of Jaucas sand (Stratum IVa) and marine sandy clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 31 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 31 ceased at 1.8 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 49. Strata Observed at Test Excavation 31

Stratum	Depth (cmbs)	Description
N/A	0-5	Asphalt
I	5-40	7.5YR 4/2, brown; extremely gravelly silt loam; weak, very fine structure; moist, very friable consistency; non-plastic; mixed origin; abrupt, smooth lower boundary; imported basalt base course fill material. This layer is associated with construction of the existing asphalt paved parking lot.
II	40-80	2.5Y 5/2, grayish brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	90-110	10YR 5/3, brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; broken/discontinuous topography; no cultural material observed; truncated buried A horizon
IVa	90-130	2.5Y 8/4, pale yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune (Zone 1) amidst the tidal flats that defined the area prior to historic land reclamation.
IVb	130-160	2.5Y 7/3, pale yellow; sandy clay; structureless massive; moist, very firm consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

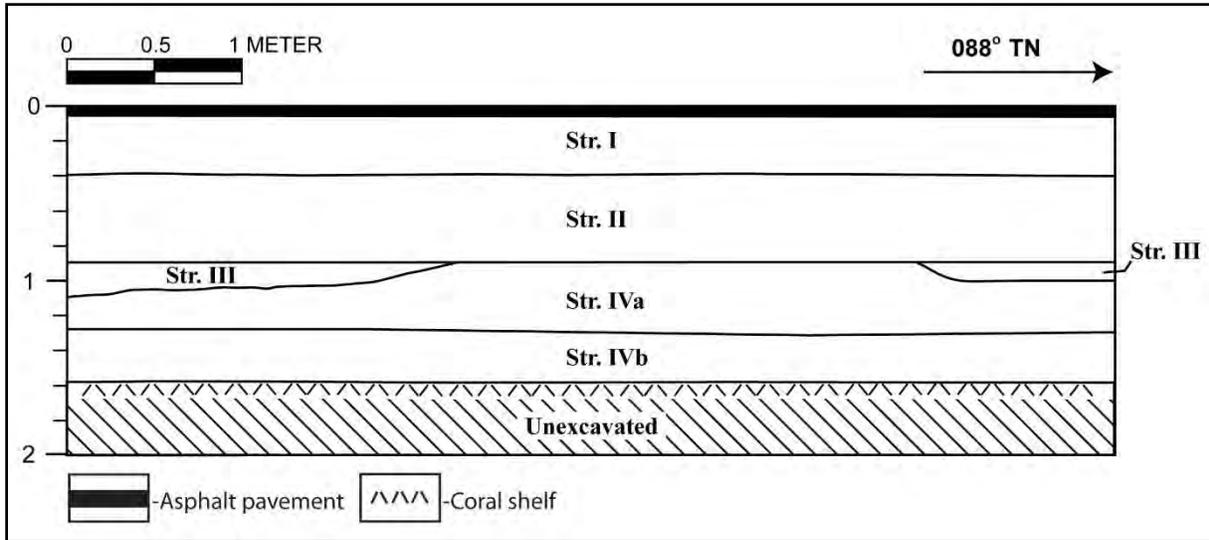


Figure 123. TE 31, stratigraphic profile of north sidewall



Figure 124. TE 31, photograph of north sidewall

## 4.2.2.36 Test Excavation 32

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NW/SE.

The stratigraphy of Test Excavation 32 (TE 32) (Table 50, Figure 125, and Figure 126) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I consists of imported fill utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill materials utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed atop Jaucas sand and is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 32 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 32 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum IV, a buried A horizon that developed atop Jaucas sand (Stratum III) and is enriched with cultural material. Observed, but not collected, cultural material included fire-cracked rock (basalt), charcoal, glass, and metal fragments. The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Stratum III is considered a cultural layer based on the presence of cultural material and subsurface pit features (see below) and has been designated as SIHP # -7580.

Two subsurface pit features (SIHP #-7580, Features C and D) were observed in plan view within TE 32 at a depth of 100 cm below the existing surface (see Figure 125, Figure 127, Figure 128, and Table 51). Both pit features originate in Stratum III and intrude into Stratum IVa. SIHP #-7580, Feature C consists of an oblong pit feature measuring 60 cm by 35 cm in plan view and in depth from 100 to 130 cm below the existing surface. The entire feature was excavated and screened (approximately 10 gallons). The identified cultural material consisted of charcoal, fire-cracked rock (basalt), and a single pig tooth. SIHP #-7580, Feature C is considered to be a fire pit utilized for food preparation.

SIHP #-7580, Feature D consists of circular pit feature measuring 60 cm in diameter and extending from 100 to 130 cm below the existing surface. The entire feature was excavated to identify cultural material content and to better determine feature function. A few glass fragments were observed, but not collected. SIHP #-7580, Feature D, is a pit of unknown function.

Table 50. Strata Observed at Test Excavation 32

Stratum	Depth (cmbs)	Description
NA	0-10	Asphalt
I	10-40	5YR 3/4, dark reddish brown; extremely gravelly silt loam; weak, very fine crumb structure; moist, very friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported basalt base course fill material. This layer is associated with construction of the existing asphalt surface.
IIa	40-80	10YR 6/2, light brownish gray, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	70-90	10YR 7/2, light gray; clay; structureless massive; moist, firm consistency; plastic; marine origin; very abrupt lower boundary; smooth topography; imported marine dredge clay associated with historic land reclamation
III	80-90	10YR 5/4, yellowish brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; observed cultural material included fire-cracked rock (basalt), charcoal, glass, and metal fragments (not collected); buried A horizon developed atop Jaucas sand and enriched with traditional Hawaiian and historic cultural material. This layer has been designated as a component of SIHP # -7580.
IVa	90-130	10YR 7/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	130-160	10YR 8/3, very pale brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

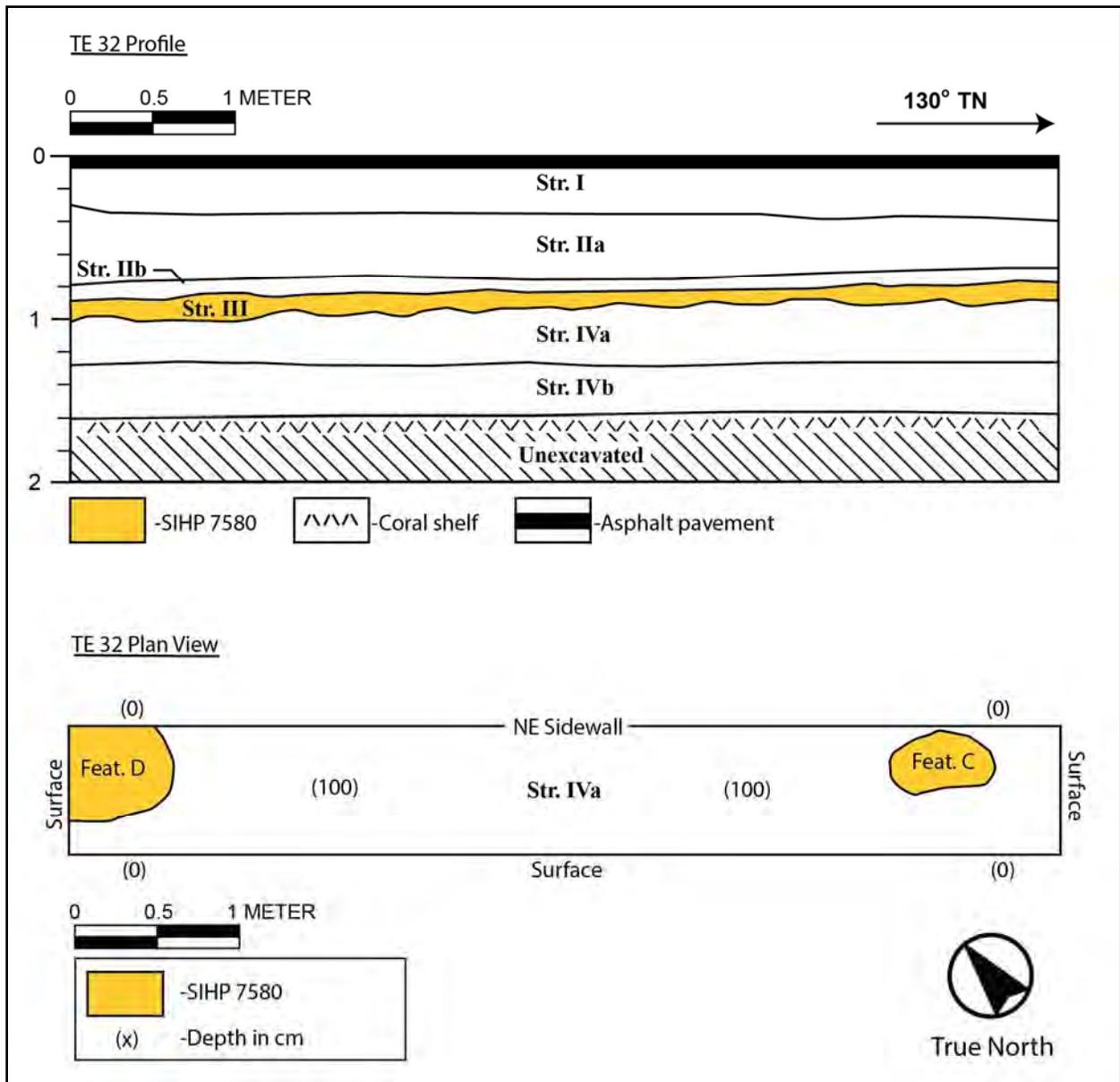


Figure 125. TE 32, stratigraphic profile of northeast sidewall (top) and plan view (bottom)



Figure 126. TE 32, photograph of northeast sidewall

Table 51. Pit Features Observed at TE 32

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	C	60 cm long by 35 cm wide	100-130	Mixture of Strata III and Iva sediments	Oblong-shaped pit feature observed in TE 32 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Basalt fire-cracked rock, a pig tooth, and charcoal	Fire pit/Food preparation
-7580	D	60 cm diameter	100-130	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 32 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Glass fragments (not collected)	Unknown



Figure 127. SIHP # -7580, Feature C (pit feature)



Figure 128. SIHP # -7580, Feature D (pit feature)

## 4.2.2.37 Test Excavation 33

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 33 (TE 33) (Table 52, Figure 129, and Figure 130) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Stratum III is a buried silty sand A horizon that developed atop Jaucas sand, and has been truncated by grading. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 33 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 33 ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 52. Strata Observed at Test Excavation 33

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of existing asphalt surface.
Ib	20-50	10YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material associated with the construction of existing asphalt surface
IIa	50-120	10YR 5/4, yellowish brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIb	90-100	10YR 6/3, pale brown; clay; structureless massive; moist, very firm consistency; slightly plastic; marine origin; abrupt lower boundary; broken/discontinuous topography; imported dredge clay material associated with historic land reclamation
III	90-120	2.5Y 3/2, very dark grayish brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon; no cultural material observed
IVa	110-130	10YR 7/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	130-150	2.5YR 7/3, pale yellow; sandy clay; structureless massive; wet, sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

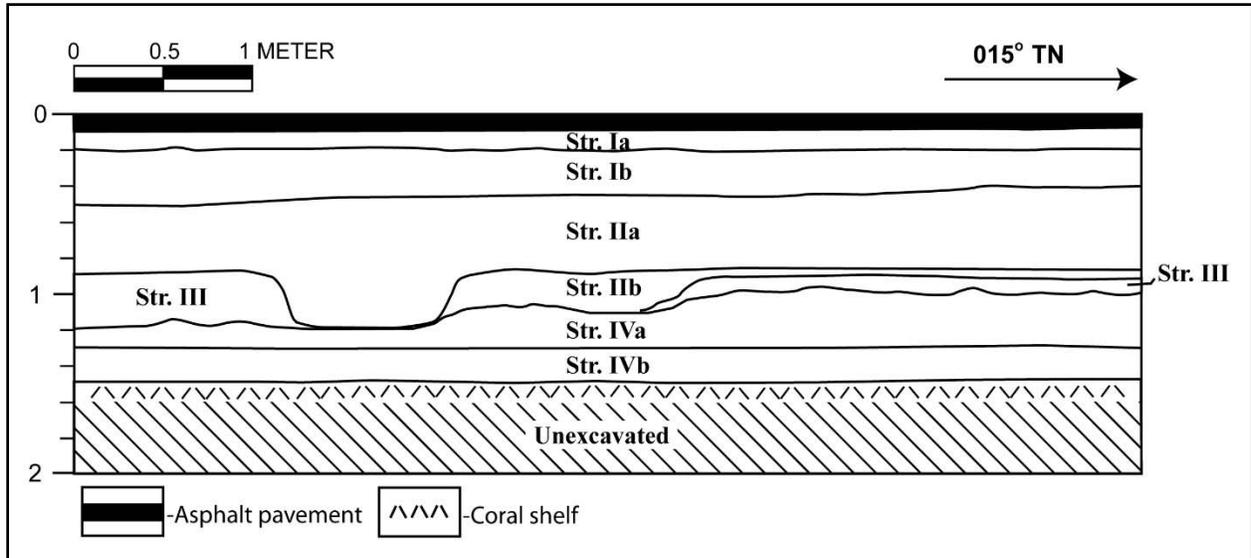


Figure 129. TE 33, stratigraphic profile of west sidewall



Figure 130. TE 33, photograph of west sidewall

## 4.2.2.38 Test Excavation 34

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 34 (TE 34) (Table 53, Figure 131, and Figure 132) consists of imported fill (Stratum I and Stratum II), a culturally sterile A horizon (Stratum III) and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill materials utilized in construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Stratum III is a buried, culturally sterile A horizon that developed atop Jaucas sand (Stratum IVa) and truncated by grading. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 12 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 34 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Table 53. Strata Observed at Test Excavation 34

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-50	10YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material associated with the construction of the existing asphalt surface
IIa	50-60	10YR 5/4, yellowish brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
IIb	60-80	10YR 7/2, light gray; sandy clay; structureless massive; moist, very firm consistency; slightly plastic; marine origin; abrupt lower boundary; broken/discontinuous topography; imported marine dredge clay material associated with historic land reclamation
III	80-90	2.5Y 3/3, dark olive brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon, no cultural material observed
IVa	90-120	10YR 8/3, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	120-170	2.5YR 7/2, light gray; clay; structureless massive; wet, sticky consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

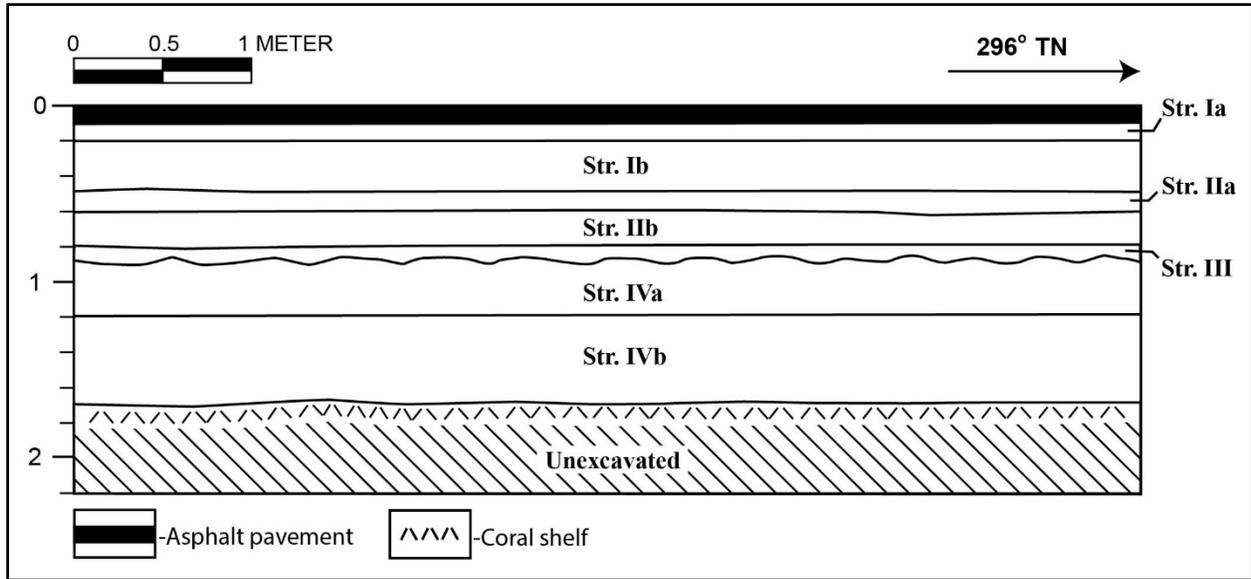


Figure 131. TE 34, stratigraphic profile of south sidewall



Figure 132. TE 34, photograph of south sidewall

## 4.2.2.39 Test Excavation 35

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 35 (TE 35) (Table 54, Figure 133, and Figure 134) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb). The Jaucas sand observed at TE 35 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 35 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum Va) and that is enriched with cultural material. Sparse marine shell midden and charcoal flecking was dispersed within the stratum. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) with the lower boundary being intact. Stratum III is considered a cultural layer based on the presence of cultural material and has been designated as a component of SIHP # -7580.

Table 54. Strata Observed at Test Excavation 35

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-30	10YR 8/2, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-50	10YR 4/3, brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	40-90	10YR 7/2, light gray; sandy clay; structureless massive; moist, very firm consistency; slightly plastic; marine origin; abrupt lower boundary; smooth topography; imported marine dredge clay material associated with historic land reclamation
III	80-100	10YR4/2, dark grayish brown; loamy sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; broken/discontinuous topography; contained sparse marine shell midden (not collected); buried A horizon enriched with cultural material. This stratum has been designated as a component of SIHP # - 7580.
IVa	90-130	10YR7/6, yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	130-170	2.5YR 7/3, very pale brown; sandy clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

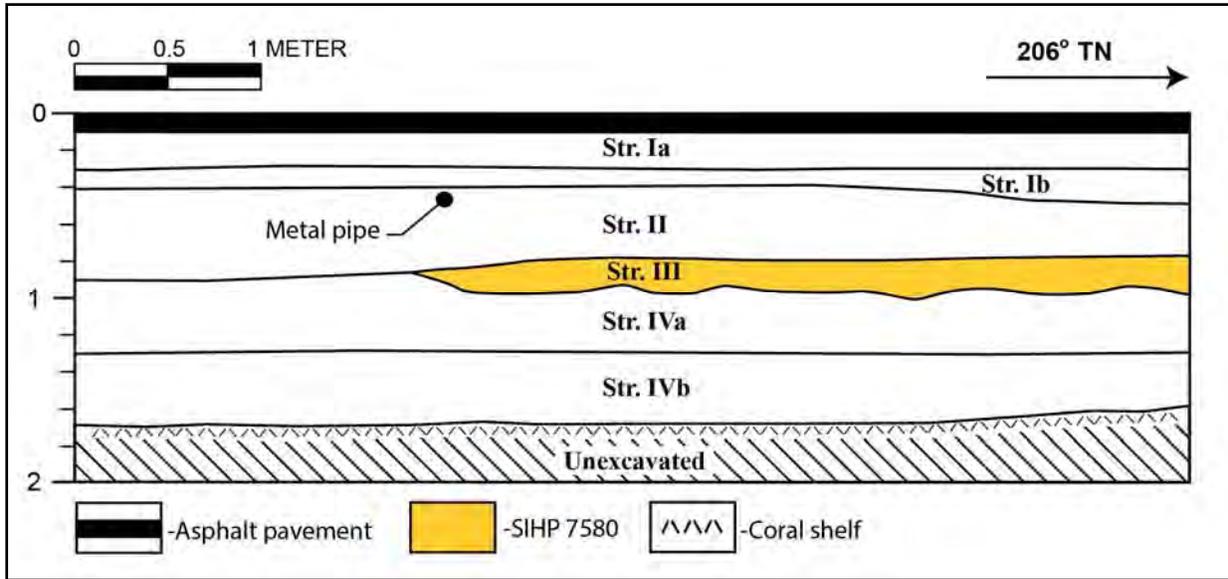


Figure 133. TE 35, stratigraphic profile of east sidewall



Figure 134. TE 35, photograph of east sidewall

## 4.2.2.40 Test Excavation 36

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 36 (TE 36) (Table 55, Figure 135, and Figure 136) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II (IIa-IIb) consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed atop Jaucas sand and that is enriched with traditional Hawaiian cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb). The Jaucas sand observed at TE 36 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. A modern utility trench encountered at the southeastern end of the trench intruded through Strata Ia, Ib, and IIb, and based on the depth of the utility pipe, likely also intruded into Stratum III (see Figure 135). Excavation of TE 36 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum Va) and that is enriched with cultural material. Sparse marine shell midden, fire-cracked rock (basalt), and charcoal flecking were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) with the lower boundary being intact. Stratum III is considered a cultural layer based on the presence of cultural material, and has been designated as a component of SIHP # -7580.

Table 55. Strata Observed at Test Excavation 36

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-30	10YR 8/2, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-40	10YR 4/3, brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	40-50	10YR 8/2, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
IIb	50-70	10YR 7/3, very pale brown; clay; structureless massive; moist, firm consistency; slightly plastic; marine origin; very abrupt lower boundary; broken/discontinuous topography; imported marine dredge clay fill material. This stratum is associated with historic land reclamation.
III	80-100	10YR 3/2, very dark grayish brown; loamy sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained sparse marine shell midden, fire-cracked rock (basalt), and charcoal; buried A horizon enriched with cultural material. This stratum has been designated as a component of SIHP # -7580.
IVa	90-130	10YR7/6, yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	130-170	2.5YR 7/2, very pale brown; sandy clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

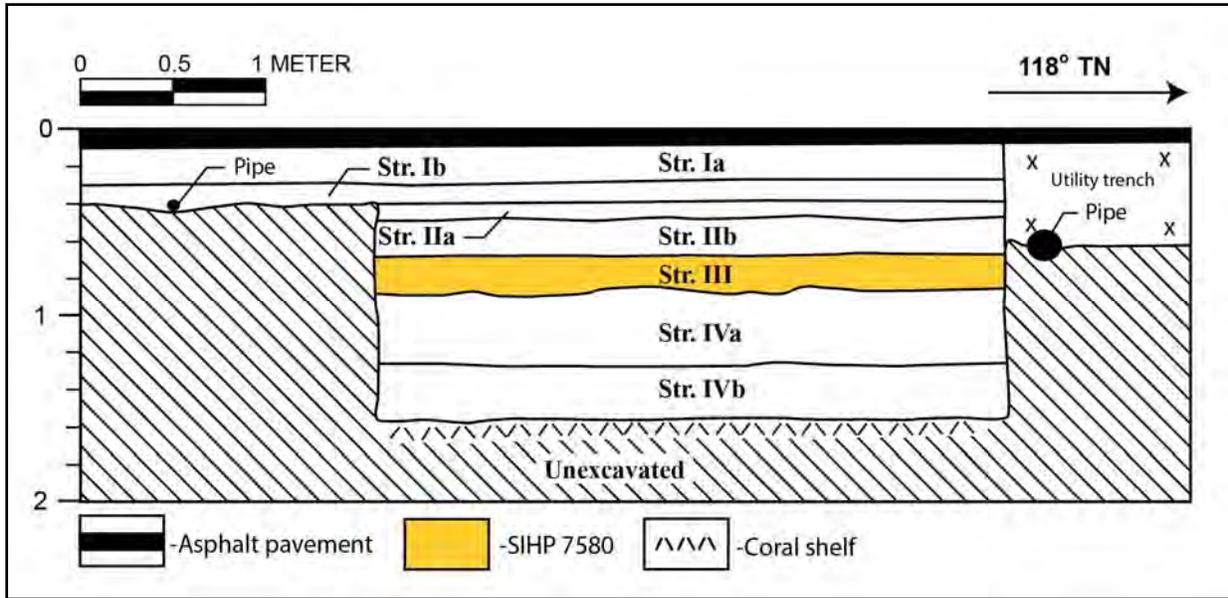


Figure 135. TE 36, stratigraphic profile of northeast sidewall



Figure 136. TE 36, photograph of northeast sidewall

## 4.2.2.41 Test Excavation 37

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 37 (TE 37) (Table 56, Figure 137, and Figure 138) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb). The Jaucas sand observed at TE 37 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 37 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

A modern disturbance was observed within the northwest end of the test excavation. The matrix in this disturbance consists of mixed Strata Ia, II, and III sediments. It is believed this disturbance is associated with the installation and removal of a subsurface utility.

Of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum Va) and that is enriched with cultural material. Sparse marine shell midden, fire-cracked rock (basalt), and charcoal flecking was dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Stratum III is considered a cultural layer based on the presence of cultural material, and has been designated as a component of SIHP # -7580.

A 15-gallon sample (Sample Area 1) was collected from Stratum III and screened for cultural content (see Figure 137). The sample was collected from 90 cmbs (top of Stratum III) to 110 cmbs. Observed and collected cultural material consisted of marine shell midden, charcoal, and fire-cracked rock, as well as glass and ceramic fragments. The cultural material was collected for analysis (see to Section 5 Results of Laboratory Analysis).

Table 56. Strata Observed at Test Excavation 37

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-40	10YR 4/3, brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-60	10YR 8/2, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
III	80-100	10YR 3/2, very dark grayish brown; loamy sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked rock, and charcoal. Glass fragments were present within the top 10-15 cm of the stratum; buried A horizon enriched with cultural material. This stratum has been designated as a component of SIHP # - 7580.
IVa	90-130	10YR6/8, brownish yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	130-170	10YR 8/2, very pale brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

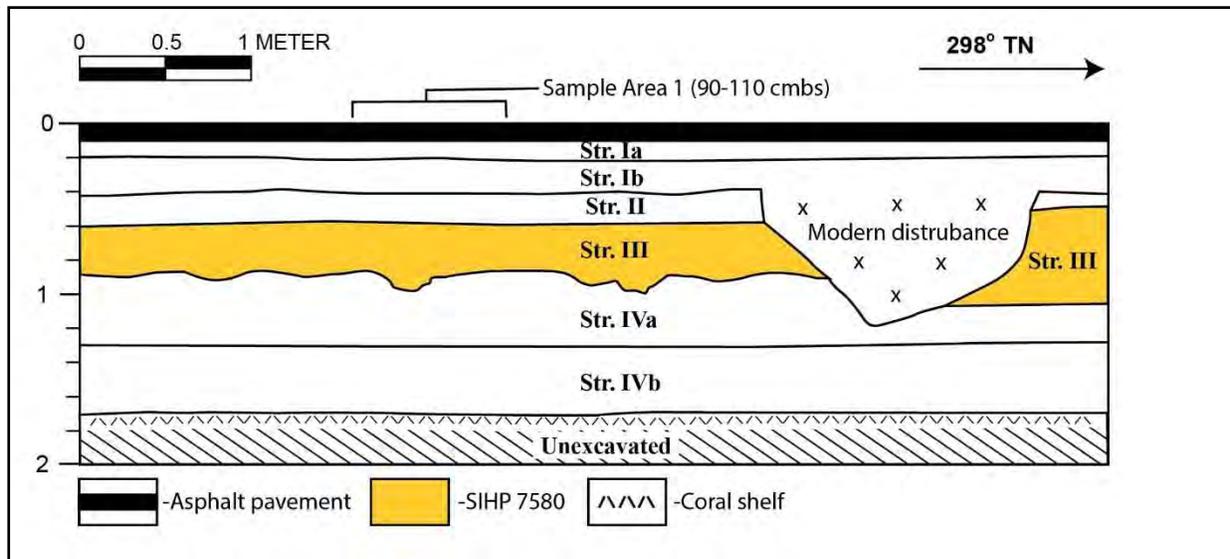


Figure 137. TE 37, stratigraphic profile of southwest sidewall



Figure 138. TE 37, photograph of southwest sidewall

## 4.2.2.42 Test Excavation 38

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 38 (TE 38) (Table 57, Figure 139, and Figure 140) consists of imported fill (Stratum I), a culturally enriched A horizon (Stratum II), and naturally deposited sediments (Stratum III). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum III consists of Jaucas sand (Stratum IIIa) and marine clay (Stratum IIIb). The Jaucas sand observed at TE 38 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 38 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a buried A horizon that developed atop Jaucas sand (Stratum IIIa) and that is enriched with cultural material. Sparse marine shell midden, fire-cracked rock (basalt), and charcoal flecking was dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Stratum III is considered a cultural layer based on the presence of cultural material and subsurface pit features, and has been designated as a component of SIHP # -7580.

A 20-gallon sample (Sample Area 1) was collected and screened for cultural content from 74 cmbs (top of Stratum II) to 110 cmbs (bottom of Stratum II) (see Figure 139). Observed cultural material within the screened sample consisted of marine shell midden, charcoal, and fire-cracked rock, as well as glass and ceramic fragments. The cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis).

Three subsurface pit features (SIHP # -7580, Feature E and Subfeatures 5 and 6) associated with Stratum II were observed within TE 38 (see Figure 139 and Table 58). All three pit features originate in Stratum II and intrude into Stratum IIIa. SIHP # -7580, Feature E consists of an amorphous-shaped pit measuring 80 cm long by 70 cm wide and extending 90 to 110 cm below the existing surface (Figure 141). A portion of the feature was excavated to identify cultural content and to better determine feature function. Cultural material within Feature E consisted of charcoal, fire-cracked rock (basalt), and marine shell midden (cultural material noted, not collected). SIHP # -7580 Feature E is identified as a fire pit utilized for food preparation

SIHP # -7580, Subfeature 5 consists of a circular pit feature with a 55 cm diameter, present from 80 to 110 cm below the existing surface (Figure 142). The entire feature was excavated to identify cultural material and to better determine its function. The cultural material consisted of sparse charcoal and marine shell midden (cultural material noted, not collected). SIHP # -7580 Subfeature 5 is a pit of unknown function.

SIHP # -7580, Subfeature 6 consists of a rectangular pit feature measuring 50 cm across in

Table 57. Strata Observed at Test Excavation 38

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-5	Asphalt
Ia	05-30	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-80	10YR 3/4, dark yellowish brown; loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; mixed imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	74-110	10YR 4/3, brown; silty sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, charcoal, and fire-cracked rock (basalt); glass fragments present within the top 10-15 cm of the stratum; buried A horizon enriched with traditional Hawaiian and western introduced cultural material. This stratum has been designated as a component of SIHP # -7580.
IIIa	90-130	10YR 6/6, brownish yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
IIIb	130-170	10YR 8/2, very pale brown; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock; Zone 1.

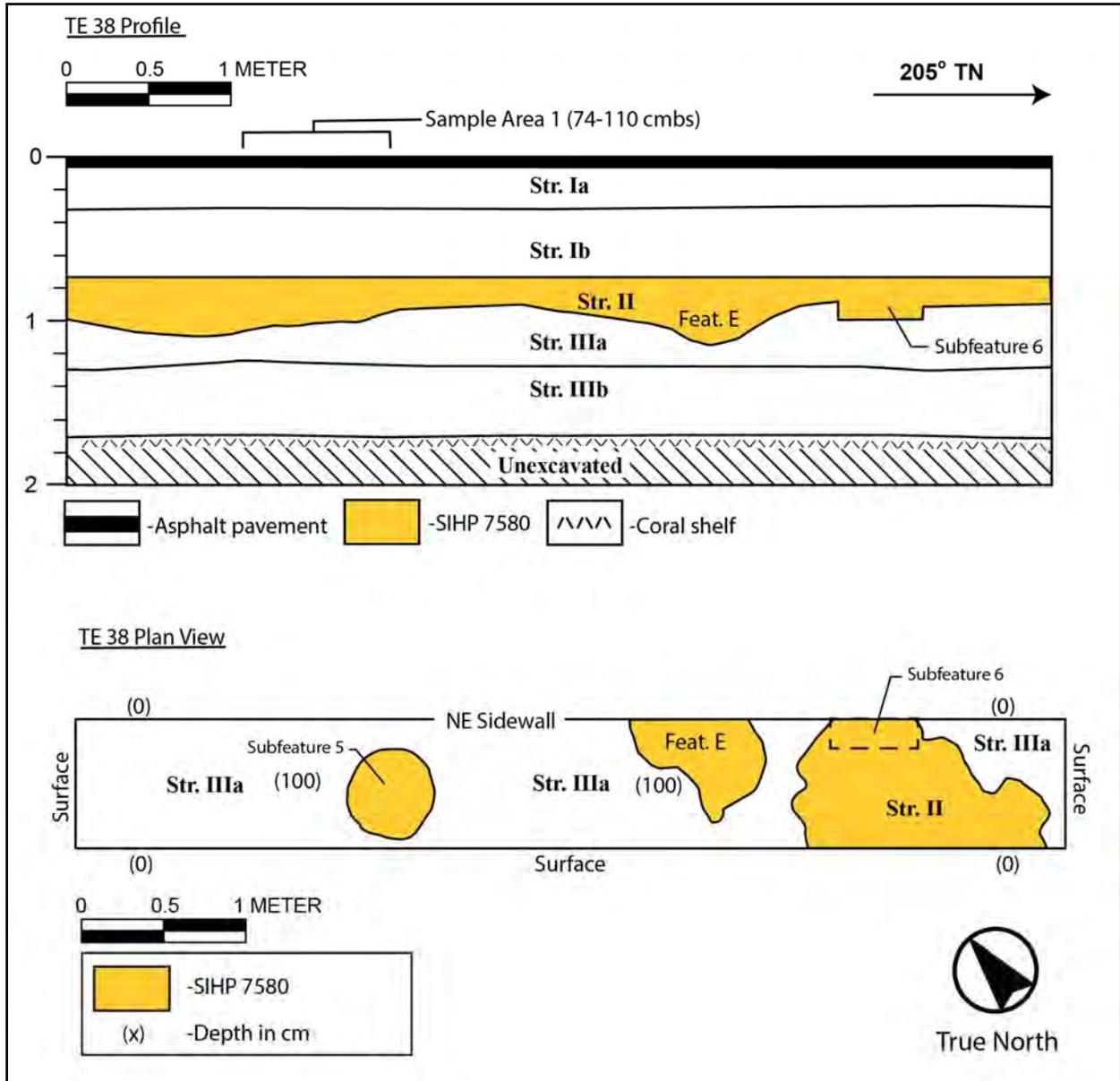


Figure 139. TE 38, stratigraphic profile of northeast sidewall (top) and plan view (bottom); note Subfeature 6 terminated at 100 cmbs

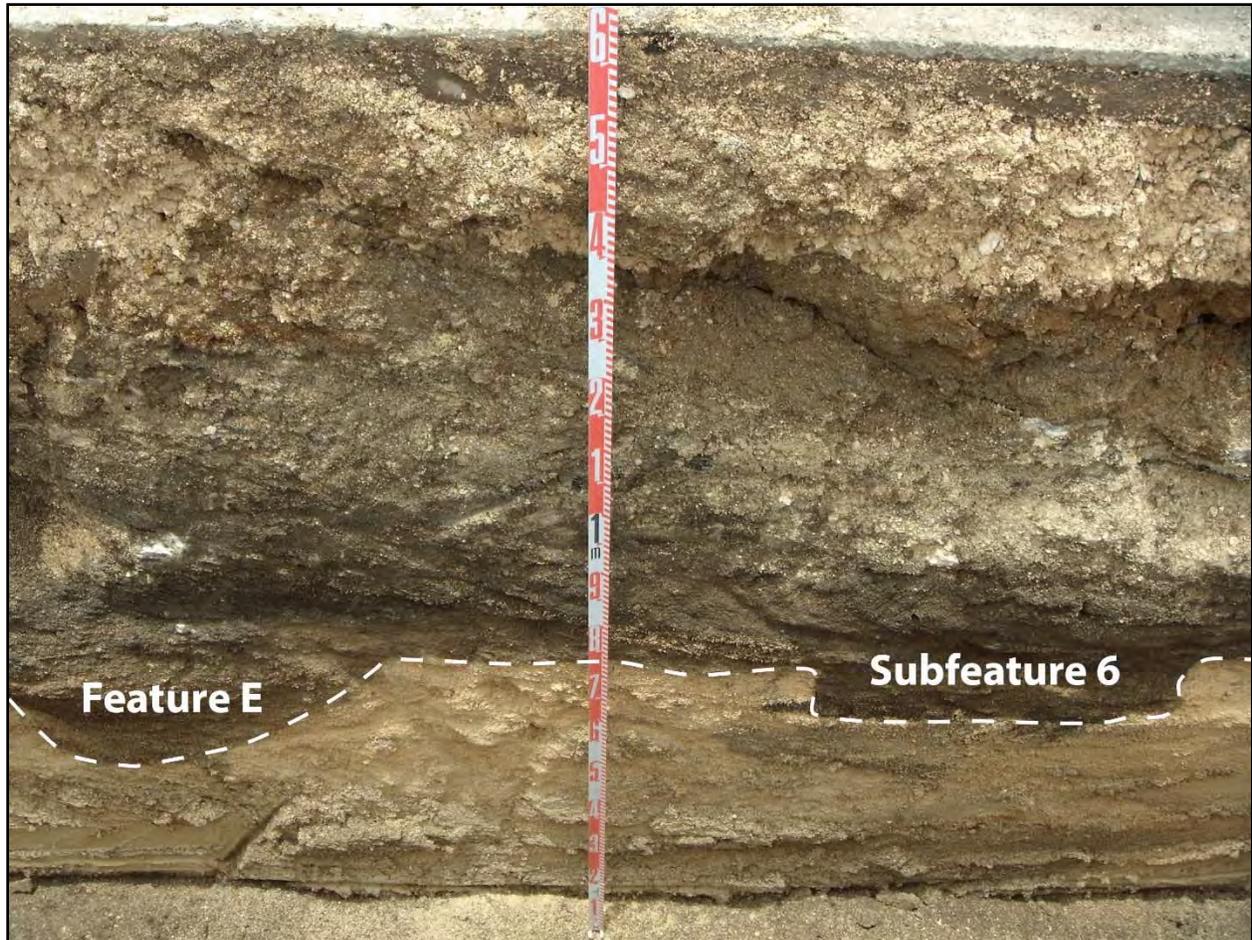


Figure 140. TE 38, photograph of northeast sidewall

Table 58. Pit Features Observed at TE 38

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	E	80 cm long by 70 cm wide	80-110	Strata II and IIIa sediments	Amorphous-shaped pit feature observed in the northeast sidewall of TE 38 and in plan view. Feature originates in Stratum II and intrudes into Stratum IIIa.	Basalt fire-cracked rock, assorted marine shell midden, and charcoal	Fire pit/Food preparation
-7580	Subfeature 5	55 cm diameter	80-110	Strata II and IIIa sediments	Circular-shaped pit feature observed in TE 38 plan view. Feature originates in Stratum II and intrudes into Stratum IIIa.	Sparse marine shell midden and charcoal	Unknown
-7580	Subfeature 6	50 cm long by approximately 20 cm wide	80-100	Strata II and IIIa sediments	Rectangular pit feature observed in the northeast sidewall of TE 38 and in plan view. Feature originates in Stratum II and intrudes into Stratum IIIa.	Sparse marine shell midden and charcoal	Unknown



Figure 141. SIHP # -7580, Feature E (pit feature), plan view



Figure 142. SIHP # -7580, Subfeature 5 (pit feature), plan view

profile and extending from 80 to 110 cm below the existing surface. A portion of the feature was excavated to identify for cultural material and to better determine its function. The cultural material consisted of sparse charcoal and marine shell midden (cultural material noted, not collected). SIHP # -7580, Subfeature 6 is a pit of unknown function.

## 4.2.2.43 Test Excavation 39

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.7 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 39 (TE 39) (Table 59, Figure 143, and Figure 144) consists of imported fill (Stratum I and Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb). The Jaucas sand observed at TE 39 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 39 ceased at 1.7 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum Va) and that is enriched with cultural material. Marine shell midden, fire-cracked rock (basalt), and charcoal flecking was dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Chert flakes were also observed during discrete sampling of the stratum (see below). The upper boundary of this stratum was truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Stratum III is considered to be a cultural layer based on the presence of cultural material, and has been designated as a component of SIHP # -7580.

A 15-gallon sample (Sample Area 1) was collected from Stratum III at the base of TE 39 (see Figure 143) and screened for cultural content. The sample collected sediment from 80 cmbs to 110 cmbs. The cultural material consisted of marine shell midden, charcoal, fire-cracked rock (basalt), and chert flakes. The cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis).

Two subsurface pit features (SIHP # -7580, Feature F and Subfeature 7) associated with Stratum III were observed within TE 39 (see Figure 143, Figure 144, and Table 60). Both pit features originate in Stratum III and intrude into Stratum IVa. SIHP # -7580, Feature F consists of a circular pit feature, measuring 45 cm diameter and extending from 85 to 115 cm below the existing surface (Figure 145). The entire feature was excavated to identify cultural material and to better determine its function. The cultural material consisted of charcoal, marine shell midden, and metal fragments. The cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis). The function of SIHP # -7580, Feature F is unknown.

Table 59. Strata Observed at Test Excavation 39

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-70	10YR 3/2, very dark grayish brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; mixed imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-70	10YR 8/1, white; clay; structure less massive; moist firm consistency; slightly plastic; marine origin; very abrupt lower boundary; smooth topography; imported marine dredge clay fill. This stratum is associated with historic land reclamation.
III	65-100	10YR 4/3, brown; silty sand; weak, fine, crumb structure; moist loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, charcoal, fire-cracked rock (basalt), chert flakes, metal and glass fragments; buried A horizon enriched with cultural material. This stratum has been designated as a component of SIHP # -7580.
IVa	85-140	10YR 6/6, brownish yellow; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
IVb	140-170	10YR 8/2, very pale brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock; Zone 1.

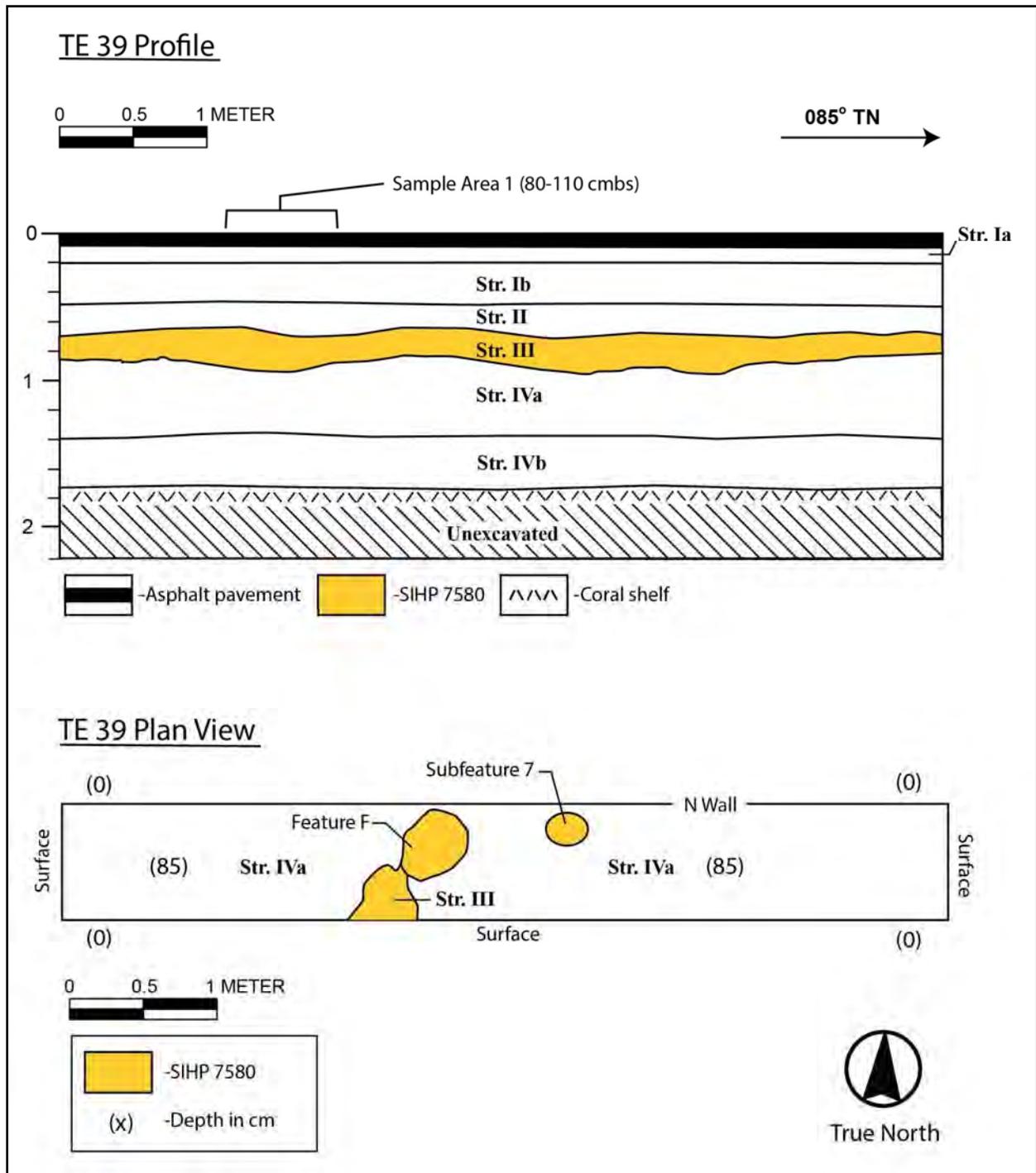


Figure 143. TE 39, stratigraphic profile of north sidewall (top) and plan view (bottom)



Figure 144. TE 39, photograph of north sidewall

Table 60. Pit Features Observed at TE 39

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	F	45 cm diameter	85-115	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 39 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Marine shell midden, charcoal, and metal fragments	Unknown
-7580	Subfeature 7	20 cm diameter	85-110	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 39 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Sparse marine shell midden	Unknown (possible postmold)



Figure 145. SIHP # -7580, Feature F (pit feature)



Figure 146. SIHP # -7580, Subfeature 7 (pit feature)

SIHP # -7580, Subfeature 7 consists of a circular pit feature measuring 20 cm diameter and extending from 85 to 110 cm below the existing surface (Figure 146). The entire feature was excavated to identify cultural material and to better determine its function. The cultural material consisted of sparse marine shell midden (not collected). Based on its shape, SIHP # -7580, Subfeature 7 is interpreted as a possible postmold.

## 4.2.2.44 Test Excavation 40

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 40 (TE 40) (Table 61, Figure 147, and Figure 148) consists of modern fill (Stratum I), historic fill (Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill. Stratum III consists of a buried A horizon that developed atop Jaucas sand and that is enriched with traditional Hawaiian and historic cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40 ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a localized fill event. Artifacts collected in the immediate vicinity (TE 40B, 40C, and 40D) from this stratum have been dated to the nineteenth century (see Section 5 Results of Laboratory Analysis). This fill layer has been designated as a component of SIHP # -7579.

Also of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) with the lower boundary being intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular, angular basalt. Glass and ceramic fragments were observed within the top 10 cm of the stratum (but not collected). Stratum III is considered to be a cultural layer and has been designated as a component of SIHP # -7580.

During the excavation of TE 40 a single intact human burial was identified (SIHP # -7580, Burial Find 1). The burial pit for Burial Find 1 originates from Stratum III and extends through Stratum VI where it stops at the coral shelf (see Figure 147). The burial pit is rectangular in shape and measures approximately 180+cm long by 50 cm wide, and was observed from 70 to 150 cm below the existing surface (Figure 149). Pit fill consisted of a mixture of Strata III and IV.

The rectangular-shaped Burial Find 1 burial pit was bisected in order to confirm the presence/absence of human skeletal remains and to gain information on burial position, orientation, age, and ethnicity. Human skeletal remains were encountered at 140 cm below the existing surface. The observed skeletal remains appear to be in an extended supine position, with the feet oriented *makai* (southwest). The position of the skeletal elements appeared to be consistent with an articulated individual. No coffin outline, coffin hardware, or burial goods were observed. However, the rectangular shape of the burial pit suggests the individual likely was

Table 61. Strata Observed at Test Excavation 40

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 6/4, light yellowish brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of existing asphalt surface.
Ib	20-40	10YR 3/3, dark brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; mixed imported fill material. This stratum is associated with construction of existing asphalt surface.
II	40-60	17.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill event and is designated as a component of SIHP # -7579.
III	60-80	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal (not collected); buried A horizon that developed atop Jaucas sand and that is enriched with cultural material; top 10 cm of stratum contained glass and ceramic fragments (not collected). This layer has been designated as a component of SIHP # -7580.
IVa	80-130	10YR 7/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
IVb	130-150	10YR 7/2, light gray; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock; Zone 1.

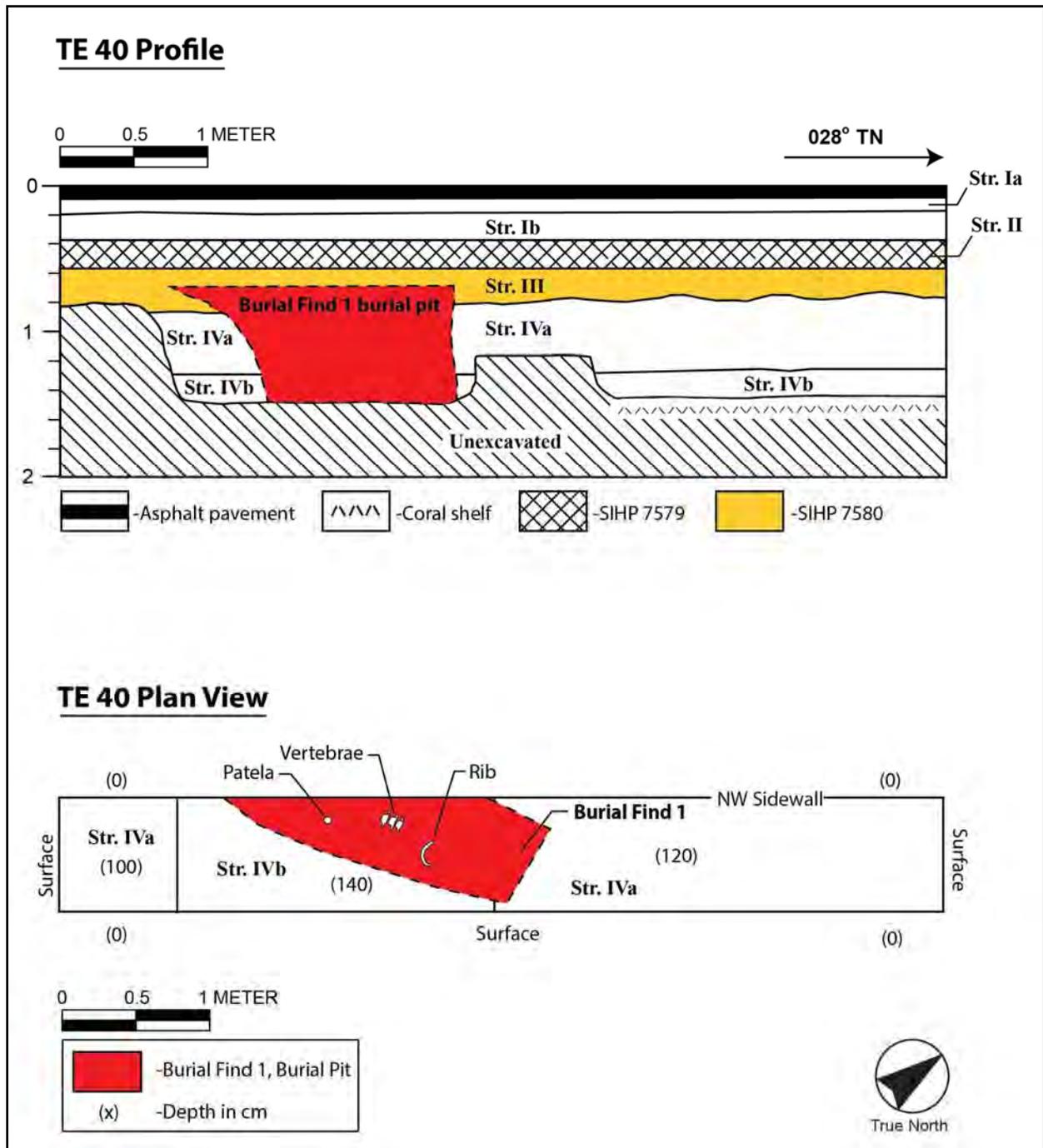


Figure 147. TE 40, stratigraphic profile of northwest sidewall (top) and plan view (bottom)

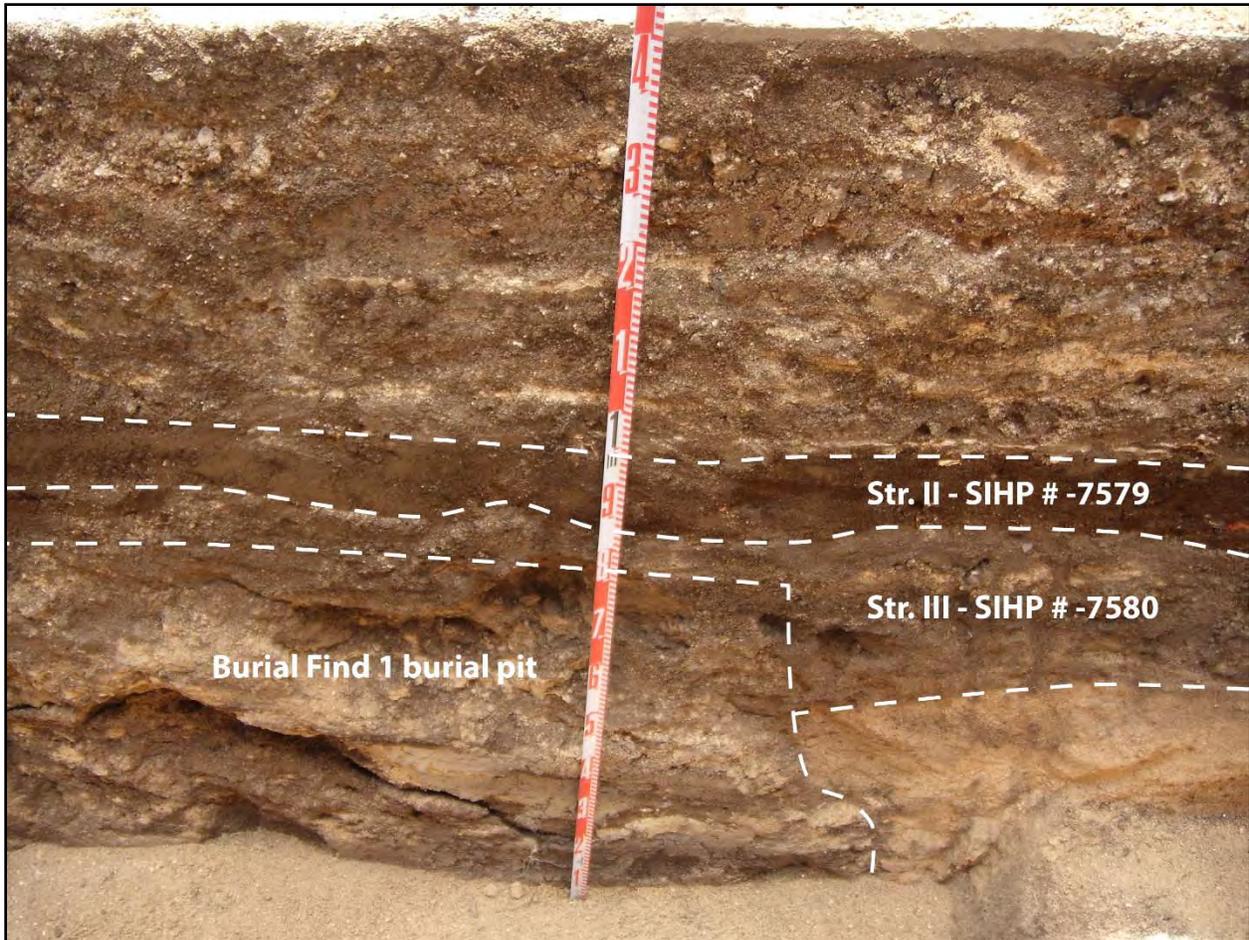


Figure 148. TE 40, photograph of northwest sidewall



Figure 149. SIHP # -7580, Burial Find 1 plan view photographs

buried in a coffin.

Burial Find 1 comprises the complete skeletal remains of an adult individual. The burial is post-Contact in age based on its rectangular burial pit and its extended supine position. Ethnicity is probable Hawaiian based on its geographic and archaeological context.

Following documentation, SIHP # -7580, Burial Find 1 was secured by covering with muslin, clean sand, and a plywood board. TE 40 was then backfilled and paved over with asphalt.

## 4.2.2.45 Test Excavation 40A

<b>Length:</b>	4 m
<b>Width:</b>	2.0 m
<b>Maximum Depth:</b>	1.55 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40A (TE 40A) (Table 62, Figure 150 through Figure 153) consists of modern fill (Stratum I), historic land reclamation fill (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally-deposited sediments (Stratum V). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40A indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40A ceased at 1.55 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a localized fill deposit. This fill layer has been designated as a component of SIHP # -7579.

Three concrete building foundations (SIHP # -7579, Features A, B, and C) were identified in TE 40A. In general, these foundations are square concrete bases (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. Each foundation column was installed by excavating a large pit through Stratum III down to the coral shelf. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular columns likely extending slightly above Stratum III. Subsequent fill events have buried these columns. These foundations have been designated as components of SIHP # -7579.

SIHP # -7579, Feature A was observed within TE 40A plan view (Table 63, Figure 154, and Figure 155). It consists of a pit feature associated with a historic building foundation column. The pit measures 100 cm long by 100 cm wide, and extended from 40 to 150 cm below the existing surface. A historic utility trench bisected the Feature A pit and toppled the rectangular concrete column. The square concrete base for the column was observed at 130 cmbs, where it rested atop the coral shelf.

SIHP # -7579, Feature B was observed within the west sidewall of TE 40A and in plan view (see Figure 152 through Figure 155 and Table 63). It consists of a pit feature associated with a historic building foundation. The pit feature measured 60 cm long by 55 cm wide, and extended from 40 to 140 cm below the existing surface. A square concrete block was observed at the base of the pit feature with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature C was observed within the east sidewall of TE 40A (see Figure 150, Figure 151, and Table 63). It consists of a pit feature associated with a historic building

Table 62. Strata Observed at Test Excavation 40A

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 7/3, very pale brown; extremely gravelly coarse sand; structureless, single grain; moist, loose consistency; non-plastic; marine origin; very abrupt lower boundary; wavy topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	15-45	10YR 4/2, dark grayish brown; sandy loam; weak, fine, crumb structure; moist very friable consistency; slightly plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	40-60	10YR4/3, brown; sandy clay loam; moderate, fine, crumb structure; moist, friable consistency; plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is identified as historic land reclamation fill.
IIb	55-75	10YR 5/4, yellowish brown; silt loam; weak, fine, crumb structure; moist, very friable consistency; slightly plastic; mixed origin; clear lower boundary; broken/discontinuous topography. This stratum is identified as historic land reclamation fill.
III	55-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill event and is designated as a component of SIHP # -7579.
IV	70-85	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal; buried A horizon developed atop Jaucas sand and enriched with cultural material. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP # -7580.
Va	80-120	10YR 7/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Vb	110-155	10YR 7/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock) ; Zone 1.

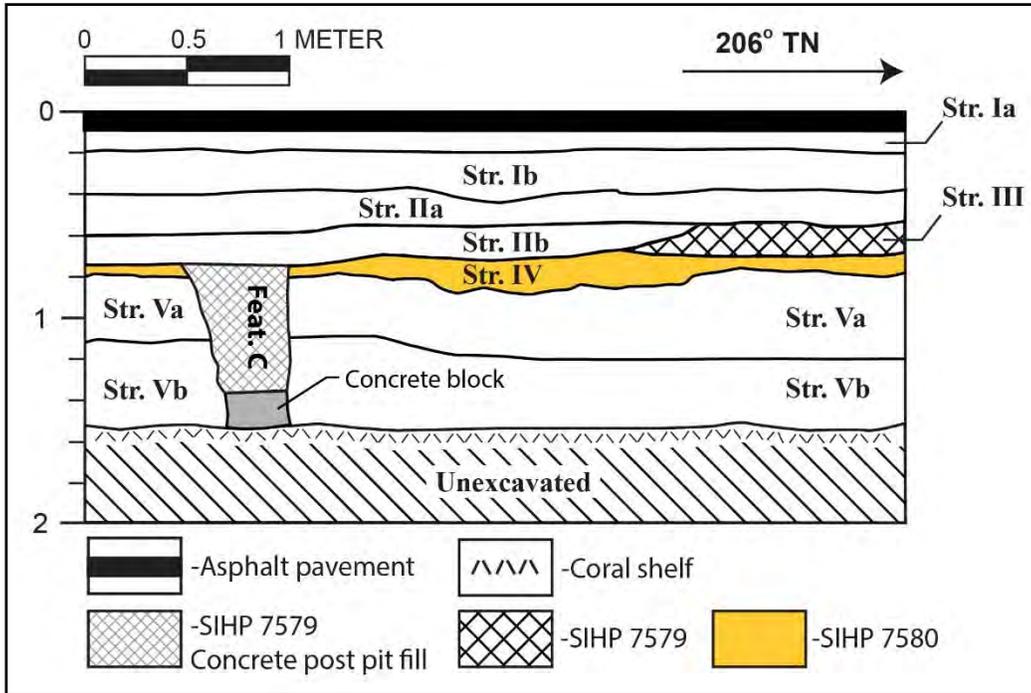


Figure 150. TE 40A, stratigraphic profile of east sidewall



Figure 151. TE 40A, photograph of east sidewall (SIHP # -7579, Feature C shown)

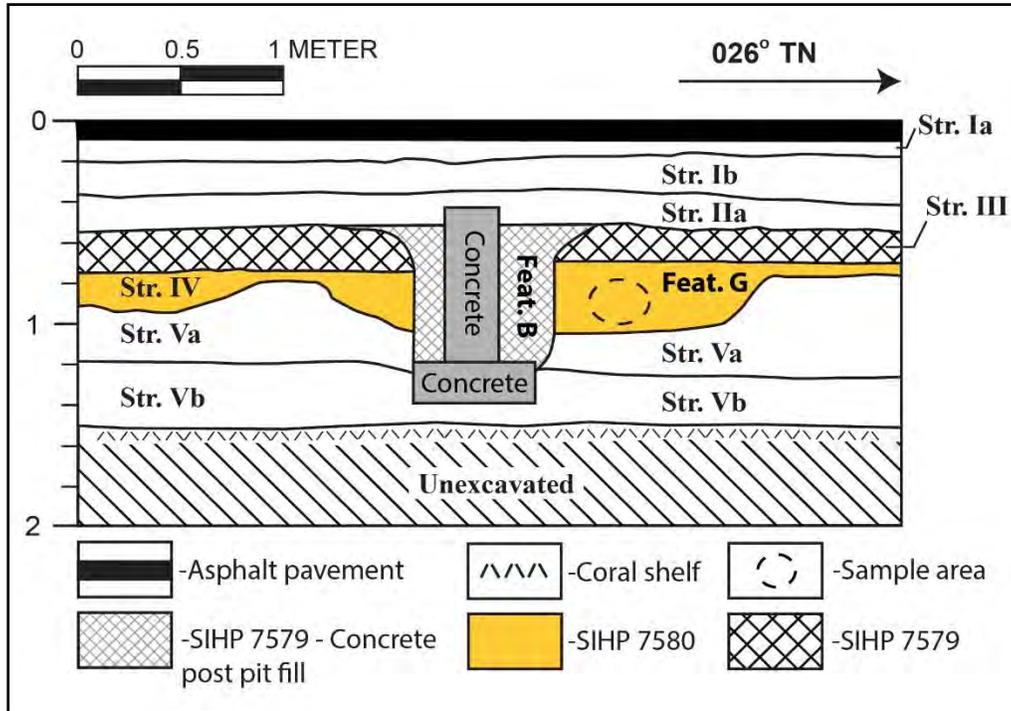


Figure 152. TE 40A, stratigraphic profile of west sidewall



Figure 153. TE 40A, photograph of west sidewall (SIHP # -7579, Feature B shown)

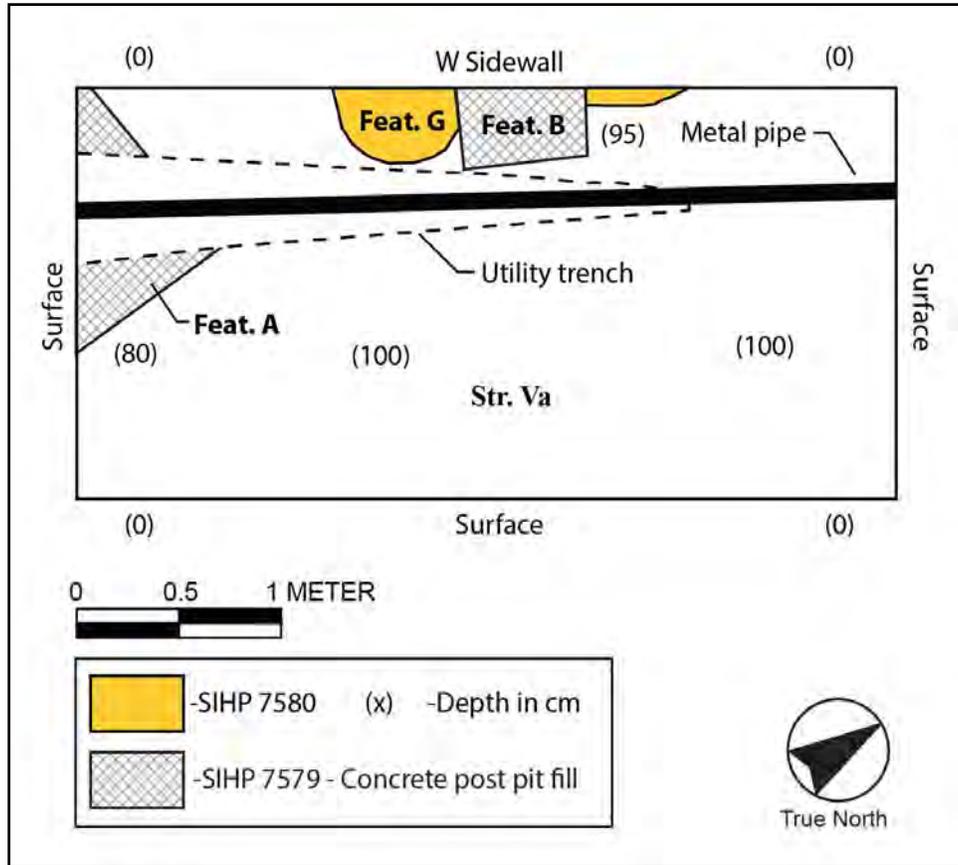


Figure 154. TE 40A plan view



Figure 155. TE 40A, photograph of excavation plan view

Table 63. Pit Features Observed at TE 40A

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7579	A	100 cm long by 100 cm wide	40-150	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A plan view. Historic utility bisects the feature and toppled the rectangular column off its base. Feature originates at the top of Stratum IIa and terminates at the coral shelf; square concrete block at base of pit.	Concrete column and base	Historic building foundation
-7579	B	60 cm long by 55 cm wide	40-140	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A plan view and in west sidewall. Feature originates at the top of Stratum IIa and terminates at the coral shelf; square concrete block at base of pit.	Concrete column and base	Historic building foundation
-7579	C	60 cm wide in profile	60-150	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A east sidewall. Feature originates at the bottom of Stratum IIa and terminates at the coral shelf; square concrete block at base of pit.	Concrete column and base	Historic building foundation
-7580	G	210 cm long by 50 cm wide	70-105	Mixture of Strata IV and Va sediments	Bowl-shaped pit feature observed in TE 40A plan view and in west sidewall. Feature originates from Stratum IV and intrudes into the underlying Jaucas sand (Str. Va). The central portion of this feature has been bisected by SIHP # -7578, Feature L.	Fire-cracked rock (basalt), charcoal and marine shell midden, fish bone	Fire pit/Food preparation

foundation. In profile, the pit feature measured 60 cm wide across, and extended from 60 to 150 cm below the existing surface. A square concrete block observed at the base of the pit feature rested atop the coral shelf. The rectangular concrete column associated with this feature was not observed, but is presumed to be present beyond the east sidewall of the test excavation.

Stratum IV consists of a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material (noted, but not collected). The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary is intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Stratum IV is considered a cultural layer and has been designated as a component of SIHP # -7580.

One pit feature (SIHP # -7580, Feature G) was observed as being associated with Stratum IV, both within the west sidewall TE 40A and in plan view (see Figure 152 through Figure 155 and Table 63). The pit feature originated within the buried A horizon and was intrusive into Stratum Va (Jaucas sand). The feature measured 210 cm long by 50 cm wide, extending from 70 to 105 cm below the existing surface. Feature G was completely excavated to identify cultural material and to determine its function. A 5-gallon screened sediment sample yielded marine shell midden, fish bone, charcoal, and fire-cracked rock (basalt). The sampled cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis). Based on its shape, size, and contents, it is believed that SIHP # -7580, Feature G is a fire pit utilized for food preparation.

## 4.2.2.46 Test Excavation 40B

<b>Length:</b>	6 m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 40B (TE 40B) (Table 64, Figure 156 through Figure 159) consists of modern fill (Stratum I), a crushed coral pavement (Stratum IIa), historic land reclamation fill (Stratum IIb), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum IIa consists of a crushed coral pavement. Stratum IIb consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with traditional Hawaiian cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40B indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40B ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum IIa, a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578. Stratum IIa overlies a historic land reclamation deposit (Stratum IIb).

Also of interest is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Four concrete building foundations (SIHP # -7579, Features D, E, F, and G) were identified in TE 40B. In general, these foundations are square concrete bases (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. Each foundation column was installed by excavating a large pit through Stratum III down to the coral shelf. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular columns likely extending slightly above Stratum III. Subsequent fill events have buried these columns.

SIHP # -7579, Feature D was observed within the northwest sidewall of TE 40B and in plan view (see Figure 156, Figure 160 and Figure 162, and Table 65). It consists of an in-filled builder's pit and a historic building foundation remnant. The pit measured 100 cm long by 100 cm wide, and extended from 50 to 150 cm below the existing surface. A square concrete block was observed at the base of the pit, with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature E was observed within the southeast sidewall of TE 40B and in plan view (see Figure 157, Figure 158, Figure 160, Figure 162, and Table 65). It consists of an in-filled builder's pit and a historic building foundation remnant. The pit measured 100 cm long by 100 cm wide, and extended from 50 to 150 cm below the existing surface. A square concrete

Table 64. Strata Observed at Test Excavation 40B

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	20-40	10YR 5/1, gray; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	40-60	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, friable consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
IIb	40-50	10YR3/2, very dark grayish brown; sandy silt loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is identified as historic land reclamation fill.
III	50-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; ceramic fragments and broken pipe stems observed and collected. This stratum is identified as a localized fill event and is designated as a component of SIHP # -7579.
IV	70-115	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal; buried A horizon developed atop Jaucas sand and that is enriched with cultural material. The top 10 cm of this stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP # -7580.
Va	80-130	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Vb	115-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock), Zone 1.

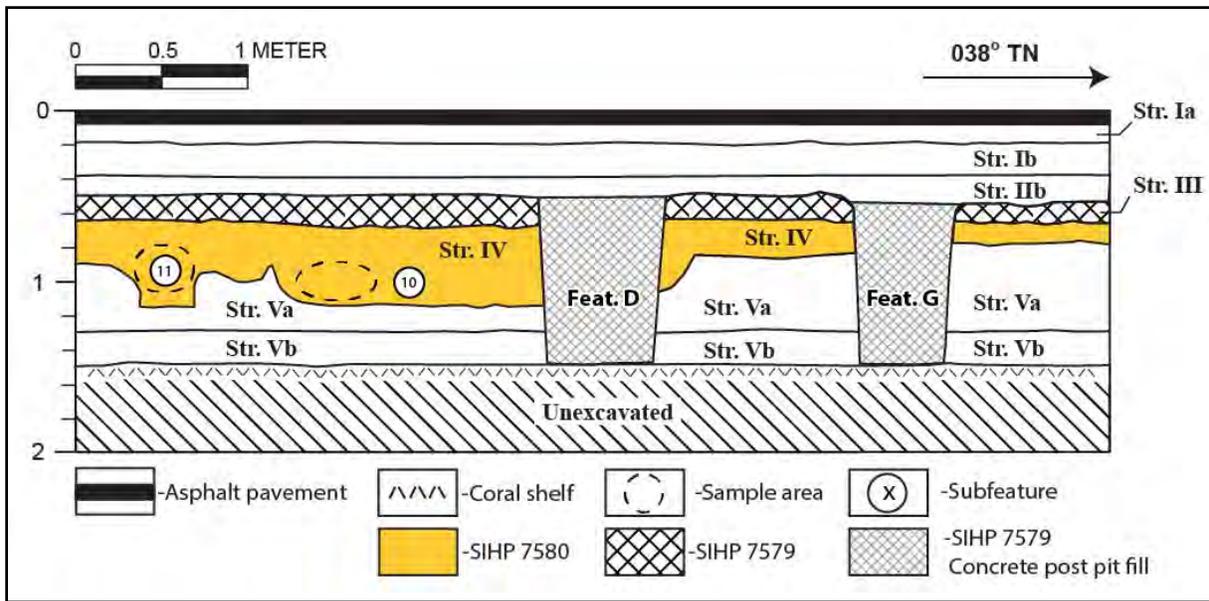


Figure 156. TE 40B, stratigraphic profile of northwest sidewall



Figure 157. TE 40B, photograph of northwest sidewall (SIHP # -7579, Feature E shown)

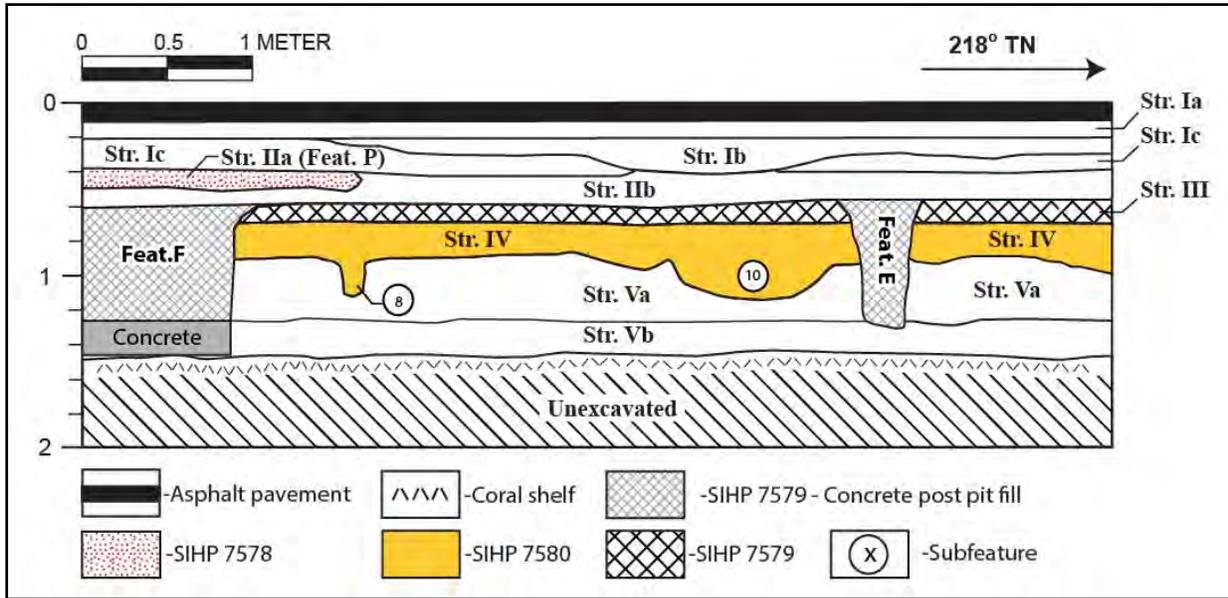


Figure 158. TE 40B, stratigraphic profile of southeast sidewall



Figure 159. TE 40B, photograph of southeast sidewall (SHIP # -7580, Subfeature 10 shown)

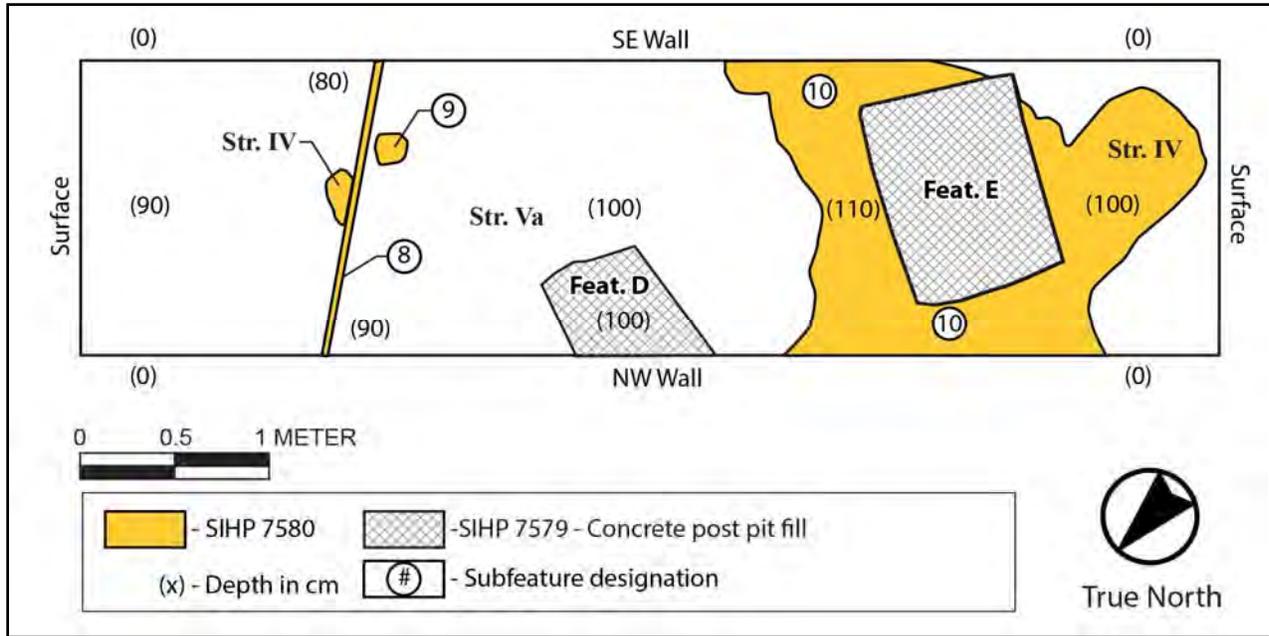


Figure 160. TE 40B plan view



Figure 161. TE 40B, photograph of excavation plan view



Figure 162. TE 40B, photograph of plan view with SIHP # -7579, Features D and E excavated showing square concrete foundation bases

Table 65. Pit Features Observed at TE 40B

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7579	D	100 cm long by 100 cm wide	50-150	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in center portion of plan view and in center of NW profile wall of TE 40B.  Pit originates in Stratum II and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
-7579	E	100 cm long by 100 cm wide	60-150	Mixture of Strata III, IV, Va, and Vb sediments	Square pit feature in plan view and rectangular-shaped in SE profile wall of TE 40B.  Pit originates in Stratum II and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
-7579	F	90 cm long	60-150	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in SE profile of TE 40B.  Pit originates in Stratum II and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
-7579	G	60 cm long	50-145	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in NW profile of TE 40B.  Pit originates in Stratum II and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
-7580	Subfeature 8	160 cm long by 15 cm wide	90-115	Mixture of Strata IV and Va sediments	Linear pit feature observed in plan view and SE profile of TE 40B.  Feature originates in Stratum IV and intrudes into Stratum Va. The entire feature was sampled and screened (approx. 3 gallons).	Sparse marine shell midden and charcoal (not collected)	Unknown

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	Subfeature 9	15 cm diameter	85-100	Mixture of Strata IV and Va sediments	Circular pit feature observed within the plan view of TE 40B. Feature originates from base of Str. IV and intrudes into Str. Va. The entire feature was sampled and screened.	None observed	Unknown
-7580	Subfeature 10	240 cm long by 160 cm wide	80-115	Mixture of Strata IV and Va sediments	Amorphous-shaped feature in plan view, and bowl-shaped in SE and NW profile walls of TE 40B. Feature originates in Stratum IV and intrudes into Stratum Va. A 19-gallon sample was screened.	Sparse charcoal, marine shell midden, and fire-cracked rock (basalt) (not collected)	Unknown
-7580	Subfeature 11	35 cm across	90-115	Mixture of Strata IV and Va sediments	Square-shaped feature in NW profile of TE 40B. Feature originates in Stratum IV and intrudes into Stratum Va. A 4-gallon sample was screened.	Charcoal and marine shell midden (collected), fire-cracked rock (basalt) (not collected)	Unknown

block was observed at the base of the pit, with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature F was observed within the southeast sidewall of TE 40B (see Figure 158, Figure 163, and Table 65). It consists of an in-filled builder's pit and a historic building foundation remnant. The pit measured 90 cm long in profile and extended from 60 to 150 cm below the existing surface. A square concrete block was observed at the base of the pit feature. The rectangular concrete column was not observed, but is believed to be still present beyond the southeast wall of the excavation.

SIHP # -7579, Feature G was observed within the northwest sidewall of TE 40B (see Figure 156, Figure 164, and Table 65). It consists of a pit feature associated with a historic building foundation. The pit feature was observed to have a 60 cm long horizontal extent in profile, and was observed from 50 to 145 cm below the existing surface. The square concrete block and rectangular column was not observed as only a corner of the building foundation excavation was encountered.

Stratum IV consists of a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) with the lower boundary being intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. All observed cultural material was noted, but not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

Four pit features (SIHP #-7580, Subfeatures 8–11) were observed originating in Stratum IV. SIHP # -7580, Subfeature 8 was observed within the southeast sidewall of TE 40B and in plan view (see Figure 158, Figure 160, and Table 65). The feature consisted of a straight-edged linear pit measuring 160 cm long by 15 cm wide and extending from 90 to 115 cm below the surface. The entire feature was excavated to identify cultural content and to better define its function. Sparse marine shell midden and charcoal were observed, but not collected. The function of this feature is unknown.

SIHP # -7580, Subfeature 9 was observed within the plan view of TE 40B (see Figure 160 and Table 65). The feature consisted of a circular pit measuring 15 cm in diameter, and extending from 85 to 100 cm below the surface. The entire feature was excavated to identify cultural content and to better define its function. No cultural material was observed. The function of this feature is unknown.

SIHP # -7580, Subfeature 10 consists of a large amorphous-shaped pit observed in the southeast and northwest sidewalls of TE 40B and in plan view (see Figure 159, Figure 165, and Table 65). The pit measured 240 cm long by 160 cm wide and extended from 80 to 115 cm below the existing surface. A 12-gallon sediment sample was collected and screened to identify cultural content and to better define its function. Sparse charcoal, marine shell midden, and fire-cracked rock were observed, but not collected. The function of the feature is unknown.

SIHP # -7580, Subfeature 11 consists of a square-shaped pit observed in the northwest sidewall of TE 40B (Figure 165 and Table 65). The feature measured 45 cm by 35 cm in profile and extended from 90 to 115 cm below the existing surface. A 4-gallon sediment sample



Figure 163. TE 40B, photograph of southeast sidewall (SHIP # -7579, Feature F shown)



Figure 164. TE 40B, photograph of southeast sidewall (SHIP # -7579, Feature G shown)



Figure 165. TE 40B, photograph of northwest sidewall (SIHP # -7580, Subfeatures 10 and 11 shown)

was collected and screened to identify cultural content and to better define its function. Charcoal and marine shell midden were observed and collected for analysis (see Section 5 Results of Laboratory Analysis). The function of the feature is unknown.

## 4.2.2.47 Test Excavation 40C

<b>Length:</b>	4 m
<b>Width:</b>	2.0 m
<b>Maximum Depth:</b>	1.3 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40C (TE 40C) (Table 66, Figure 166 through Figure 169) consists of modern fill (Stratum I), a crushed coral pavement (Stratum IIa), historic land reclamation fill (Stratum IIb), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum IIa consists of a crushed coral pavement. Stratum IIb consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40C indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. A modern utility pit was encountered in the northeastern end of the test excavation. The upper limit of the utility pit is truncated by Stratum Ib while the pit intrudes into Strata IIa through III, and Burial Find 2 burial pit. Excavation of TE 40C ceased at 1.3 m below the existing surface after encountering three additional human burials (Burial Finds 3-5).

Of note is Stratum IIa, a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.

Also of interest is Stratum III, a localized fill event. Artifacts collected from this deposit date to the nineteenth century (see Section 5 Results of Laboratory Analysis). This fill layer has been designated as a component of SIHP # -7579.

One concrete building foundation (SIHP # -7579, Feature H) was identified in TE 40C. The foundation consists of a square concrete base (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. The foundation column was installed by excavating a large builder's pit through Stratum III down to the coral shelf. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular column likely extending slightly above Stratum III. The upper limit of the builder's pit was truncated by Stratum IIb (see Figure 166 and Figure 167).

Table 66. Strata Observed at Test Excavation 40C

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	20-45	10YR 5/1, gray; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of existing asphalt surface.
N/A	35-110	Modern utility pit. The fill is a mixture of Strata IIa through III and Burial Find 2 burial pit sediments.
IIa	40-45	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.
IIb	40-60	10YR3/2, very dark grayish brown; sandy silt loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is identified as historic land reclamation fill.
III	50-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; ceramic fragments (collected) and crushed red brick (not collected) observed. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	70-125	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal; square metal nail collected from the top 10 cm of the stratum; buried A horizon that developed atop Jaucas sand. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP # -7580.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Va	95-100	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
Vb	100-120	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock), Zone 1.

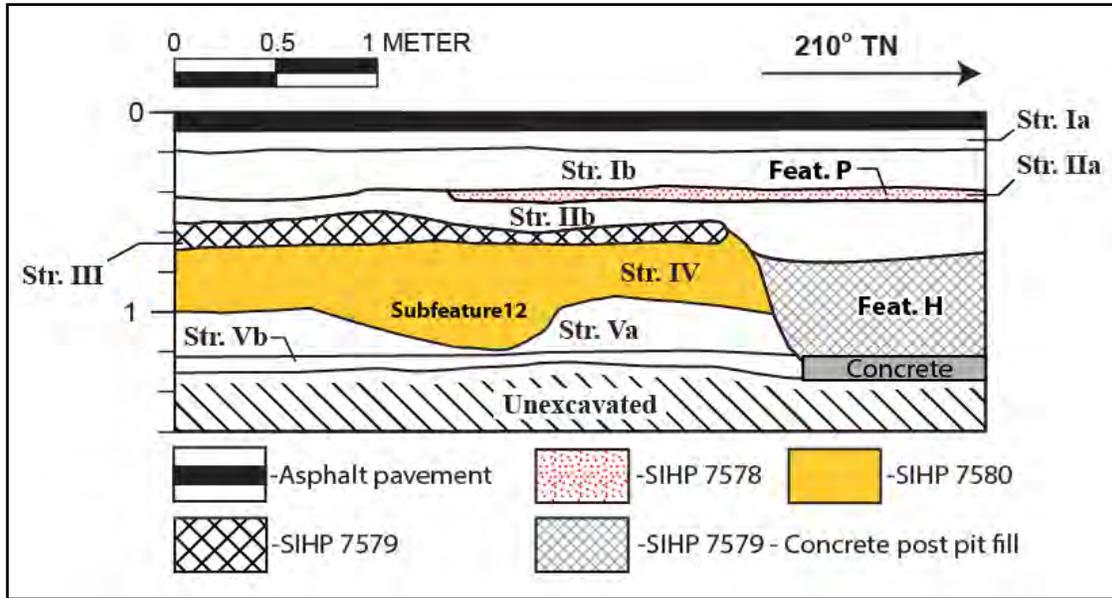


Figure 166. TE 40C, stratigraphic profile of east sidewall

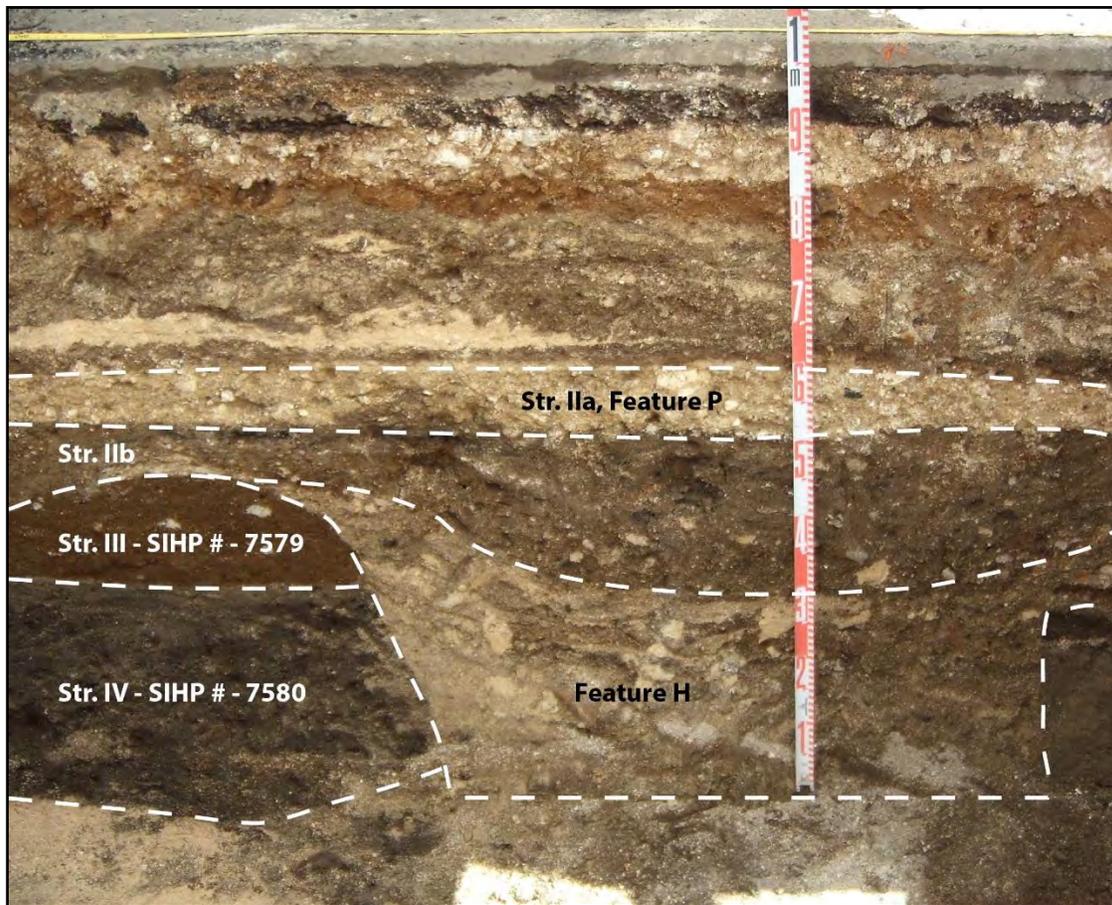


Figure 167. TE 40C, photograph of east sidewall (SIHP # -7579, Feature H shown)

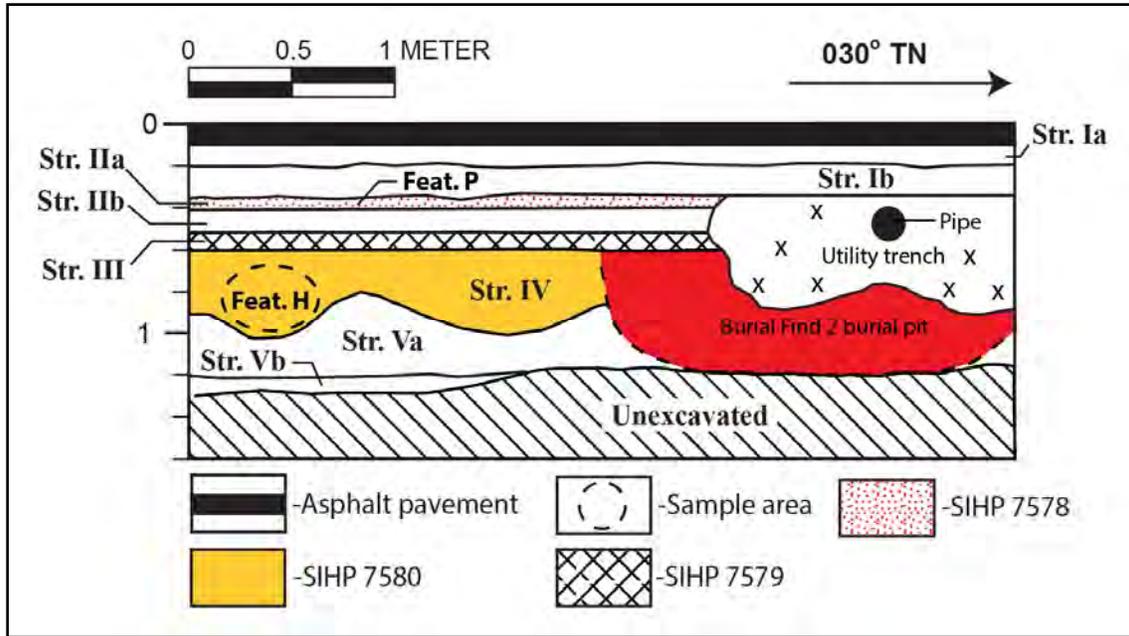


Figure 168. TE 40C, stratigraphic profile of west sidewall

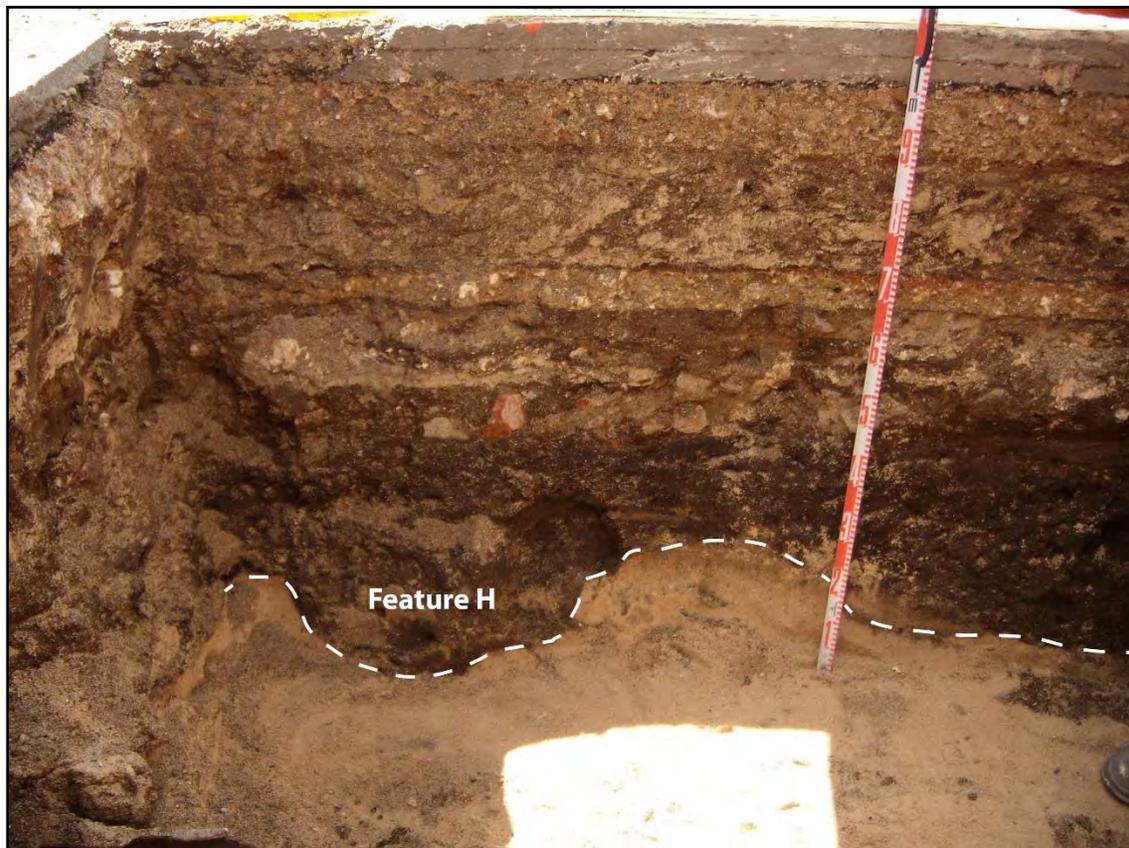


Figure 169. TE 40C, photograph of west sidewall (SIHP # -7580, Feature H shown)

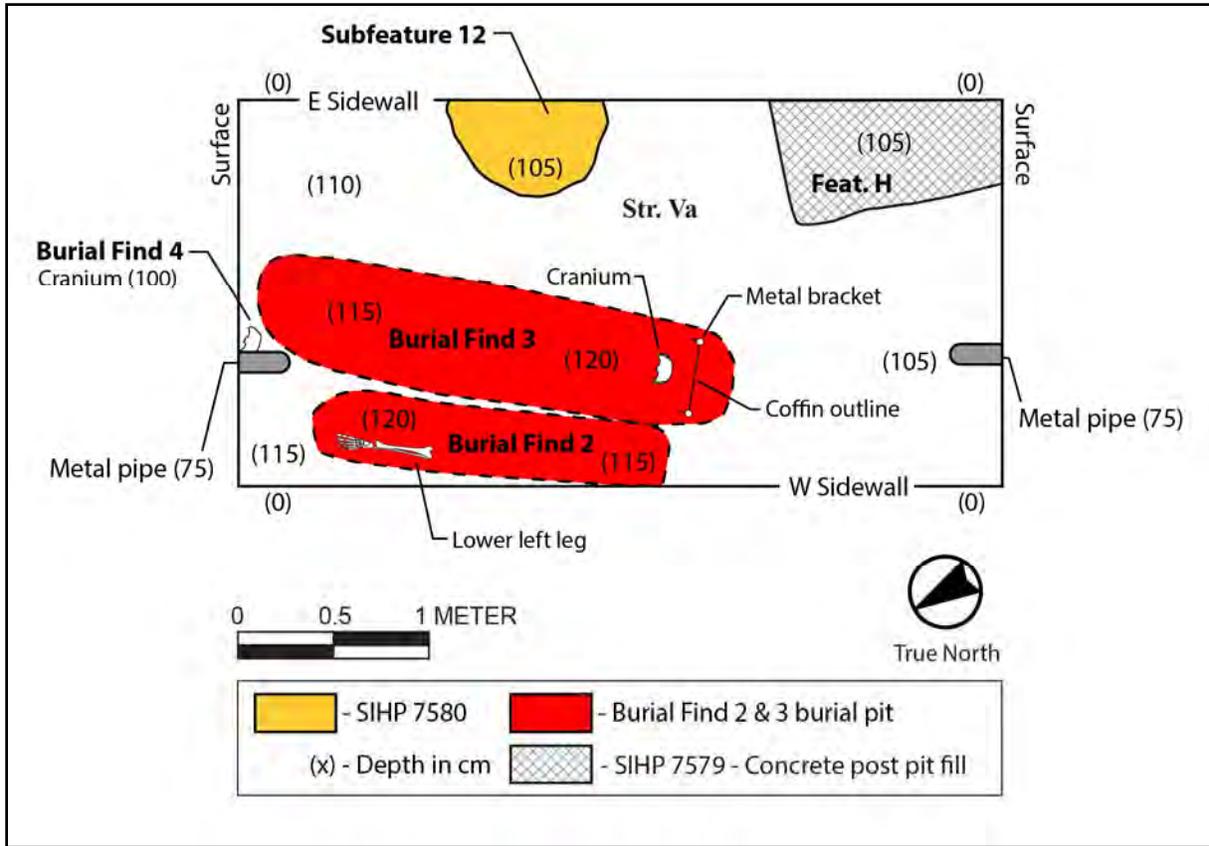


Figure 170. TE 40C, plan view

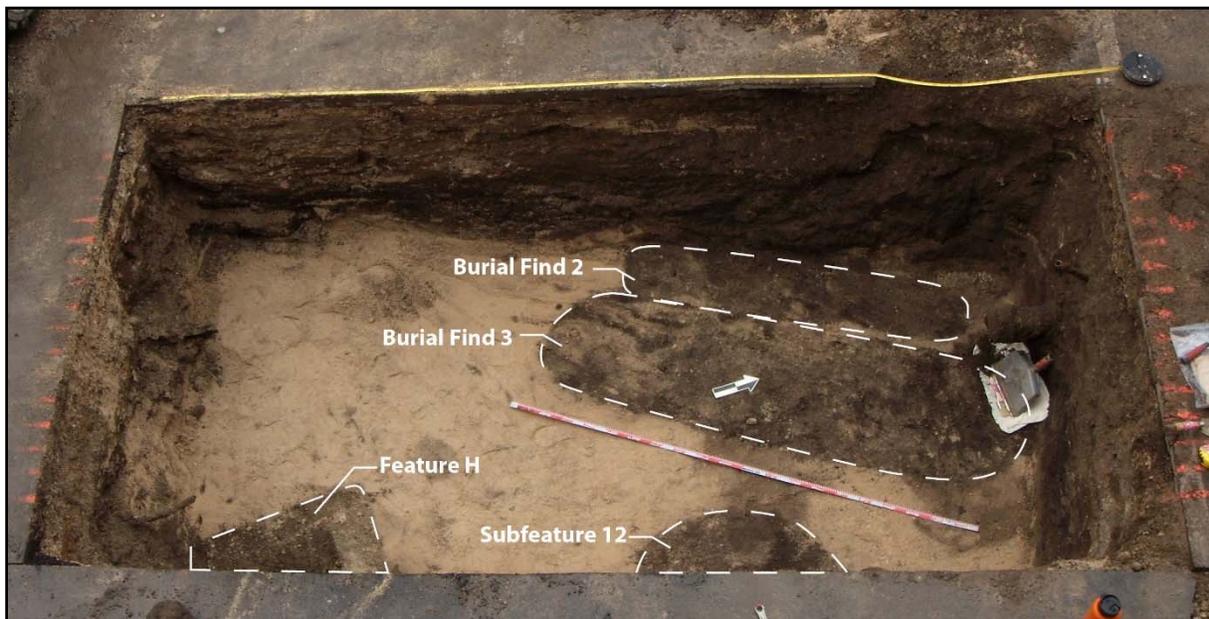


Figure 171. TE 40C, photograph of excavation plan view (note reverse direction to Figure 170)

Table 67. Pit Features Observed at TE 40C

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7579	H	100 cm long by 60+ cm wide	70-130	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in east profile wall of TE 40C and in plan view. Feature is truncated by Stratum IIb and terminates in Stratum Vb. A square concrete block sits at the base of the pit.	Concrete column and base	Historic building foundation
-7580	H	50 cm across in profile	80-100	Mixture of Strata IV and Va sediments	Bowl-shaped pit feature observed in west sidewall profile of TE 40C. Feature originates in Stratum IV and intrudes into Stratum Va. A 3-gallon sample was screened.	Sparse marine shell midden, <i>kukui</i> nut shell, dog tooth, fire-cracked rock (basalt), and charcoal (only charcoal collected)	Fire pit/Food preparation
-7580	Subfeature 12	80+ cm diameter	105-120	Mixture of Strata IV and Va sediments	Circular-shaped pit feature observed in east profile of TE 40C and in plan view. Feature originates near the base of Str. IV and intrudes into Str. Va. Five-gallon sample was screened.	Sparse marine shell midden, and charcoal flecking (not collected)	Unknown

SIHP # -7579, Feature H was observed within the east sidewall of TE 40C and in plan view (see Figure 166, Figure 167, Figure 170, Figure 171, and Table 67). It consists of an in-filled builder's pit and a historic building foundation remnant. The pit measured 100 cm long by 60+ cm wide, and extended from 70 to 130 cm below the existing surface. A square concrete block was observed at the base of the pit, with a rectangular concrete column freestanding atop the square block.

Stratum IV consists of a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material and a single square cut nail. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. A square cut nail was observed and collected from the top 10 cm of the stratum. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. All observed cultural material was noted, but not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

Two pit features (SIHP # -7580, Feature H and Subfeature 12) were observed originating in Stratum IV. SIHP # -7580, Feature H was observed within the west sidewall of TE 40C (see Figure 168, Figure 169, and Table 67). Feature H consisted of a circular pit that measured 20 cm by 60 cm in profile, and extended from 80 to 100 cm below the surface. The entire feature was excavated to identify cultural content and to better define its function. A 3-gallon screened sediment sample yielded a single dog tooth, sparse marine shell midden, fire-cracked rock (basalt), *kukui* nut shell, and charcoal. Only the charcoal was collected. SIHP # -7580, Feature H is determined to be a fire pit associated with food preparation based on its size, shape, and contents.

SIHP # -7580, Subfeature 12 was observed within the east sidewall of TE 40C and in plan view (see Figure 166, Figure 170, Figure 171, Figure 172, and Table 67). The feature consisted of a circular pit with an approximately 80+ cm diameter, and that extended from 105 to 120 cm below the surface. The entire feature was excavated to identify cultural content and to better define its function. Sparse marine shell midden and charcoal was observed, but not collected. The function of this feature is unknown.

During the excavation of TE 40C three human burials were identified (SIHP # -7580, Burial Finds 2, 3, and 4). Burial Find 2 consists of an intact coffin burial. The burial pit for Burial Find 2 was truncated by Stratum III and a modern utility pit. The utility pit, which was truncated by Stratum Ib, extended through SIHP # -7578, Feature P, several fill layers (Strata Ib and III), and removed portions of both Strata IV (SIHP # -7580 cultural layer) and the Burial Find 2's pit fill (see Figure 168). The base of the burial pit was not exposed, so it remains unknown whether it intrudes into or through Stratum Vb to the coral shelf. The burial pit is rectangular in shape and measures approximately 160 cm long by 35 cm wide, and was observed from 60 to 120 cm below the existing surface (see Figure 170 and Figure 173). Pit fill consisted of a mixture of Strata IV and Va, and possibly Vb.

The Burial Find 2 burial pit was bisected in order to confirm the presence/absence of human skeletal remains and to obtain information on burial position, orientation, age, and ethnicity. Human skeletal remains were encountered at 120 cm below the existing surface. The burial was determined to be within an extended supine position, with the feet oriented *mauka* (northeast).



Figure 172. TE 40C, photograph of east sidewall (SIHP # -7580, Subfeature 12 shown)

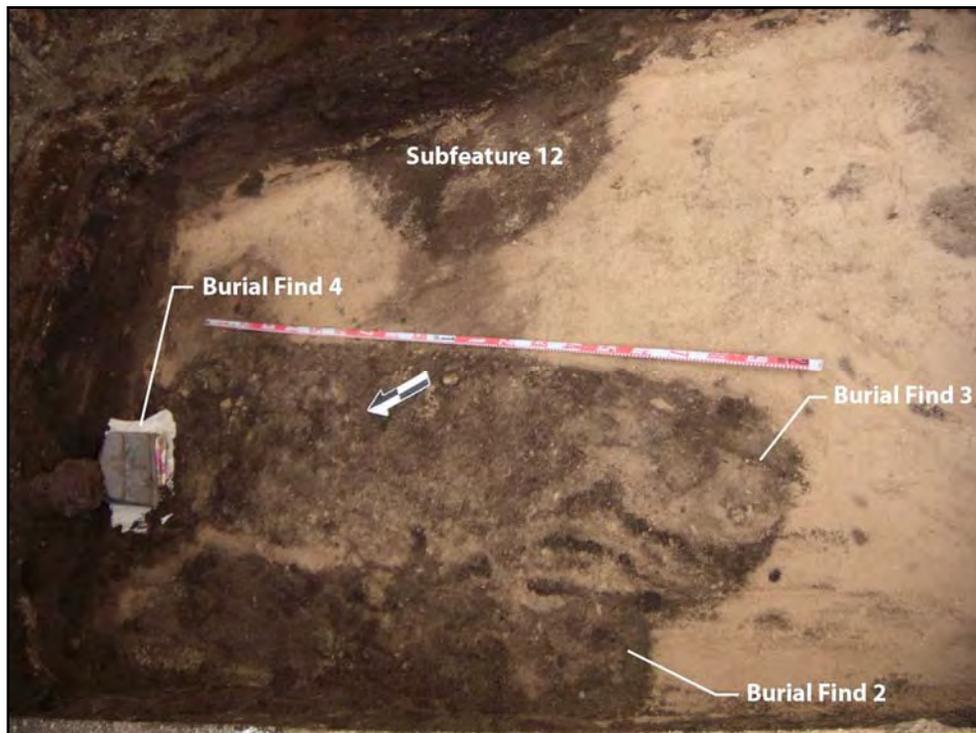


Figure 173. TE 40C, photograph of excavation plan view (SIHP # -7580, Burial Finds 2-4 and Subfeature 12 shown)

No coffin outline, coffin hardware, or burial goods were observed. Burial Find 2 was not fully exposed but the observed portions indicate that it consists of the complete skeletal remains of a juvenile individual.

Burial Find 3 consists of an intact coffin burial (see Figure 170 and Figure 173). The burial pit for Burial Find 3 is intrusive into Stratum IV (SIHP # -7580, cultural layer) and Stratum Va (Jaucas sand). The burial pit is rectangular in shape and measures approximately 200 cm long by 60 cm wide and was observed from 60 to 120 cm below the existing surface; the base of the burial pit was not exposed, so it remains unknown whether it intrudes into or through Stratum Vb to the coral shelf. Its upper extent, like Burial Find 2, likely was truncated by Stratum III (see Burial 2 pit profile in Figure 168). Pit fill consisted of a mixture of Strata IV and Va, and possibly Vb.

The Burial Find 3 burial pit was partially bisected in order to confirm the presence/absence of human skeletal remains and to gain information on burial position, orientation, age, and ethnicity. Human skeletal remains were encountered at 120 cm below the existing surface. The burial is believed to be in an extended supine position, with the head oriented *makai* (southwest). A coffin outline was observed bordering the exposed cranium, with deteriorated metal brackets observed at the corners of the coffin outline (see Figure 170). No burial goods were observed. Burial Find 3 consists of the skeletal remains of an adult individual.

Burial Find 4 consists of an adult cranium observed between the northeastern end of Burial Find 3 and the northeastern sidewall of TE 40C (see Figure 170 and Figure 173). The cranium was identified at 100 cm below the existing surface, beneath a metal pipe. The installation of the metal pipe appears to have fractured the cranium and to have obscured the presence of any burial pit that may be associated with the cranium. It is believed Burial Find 4 extends to the east beyond the limits of TE 40C and is present within the unexcavated bulk between TE 40 and TE 40B.

Following investigation and documentation, Burial Finds 2, 3, and 4 were secured by covering with muslin, clean sand, and a plywood board. TE 40C was then backfilled and paved over with asphalt.

## 4.2.2.48 Test Excavation 40D

<b>Length:</b>	14 m
<b>Width:</b>	2.5 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40D (TE 40D) (Table 68, Figure 174, and Figure 175) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40D indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40D ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Three utility pits were encountered in TE 40D. The first consists of a modern utility pit that was truncated by Stratum Ia (see Figure 175). The second utility pit was truncated by Stratum Ib and was intrusive through the crushed coral pavement (SIHP # -7578, Feature P), Stratum III (SIHP # -7579), a portion of the Burial Find 5 burial pit, and Stratum IV (SIHP # -7580) (Figure 176). The third utility pit was truncated by the crushed coral pavement and was intrusive through Stratum III (SIHP # -7579) and Stratum IV (SIHP # -7580) (see Figure 174).

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

Also of interest is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Two concrete building foundations (SIHP # -7579, Features I and J) were identified in TE 40D. In general, these foundations are square concrete bases (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. Feature J foundation column was installed by excavating a large builder's pit through Stratum III down to the coral shelf. Feature I was presumably installed in a similar manner. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular columns likely extending slightly above Stratum III. Subsequent fill events have truncated and buried these columns. These foundations have been designated as components of SIHP # -7579.

SIHP # -7579, Feature I was observed within plan view and in the western sidewall of TE 40D (Figure 174, Figure 176 through Figure 178, and Table 69). It consists of an in-filled builder's pit containing a historic building foundation remnant. The upper portion of the pit was truncated by a modern utility pit. The pit measured 100 cm long by 80 cm wide and extended from 50 to

Table 68. Strata Observed at Test Excavation 40D

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of existing asphalt surface.
N/A	19-92	Modern utility pit. Pit fill is a mixture of Strata Ib through IV.
Ib	20-35	10YR 5/1, gray; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography. Imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	41-81	Modern utility pit. Pit fill is a mixture of Strata II, III, Burial Find 5's burial pit fill, and IV.
II	35-50	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, friable consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
N/A	44-83	Historic utility pit. Pit fill is a mixture of Strata III and IV.
III	45-65	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; ceramic fragments (collected) and crushed red brick (not collected) observed. This stratum is identified as a localized fill deposit is designated as a component of SIHP # -7579.
IV	65-120	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography. Contained marine shell midden, fire-cracked-rock (basalt), charcoal, a bone awl, a basalt core stone, clay tobacco pipe stem, and a ceramic fragment; buried A horizon that developed atop Jaucas sand and that is enriched with traditional Hawaiian and imported cultural material. In some areas, the top 10 cm of the stratum was truncated by a utility trench. This layer has been designated as a component of SIHP # -7580.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Va	75-120	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
Vb	120-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock), Zone 1.

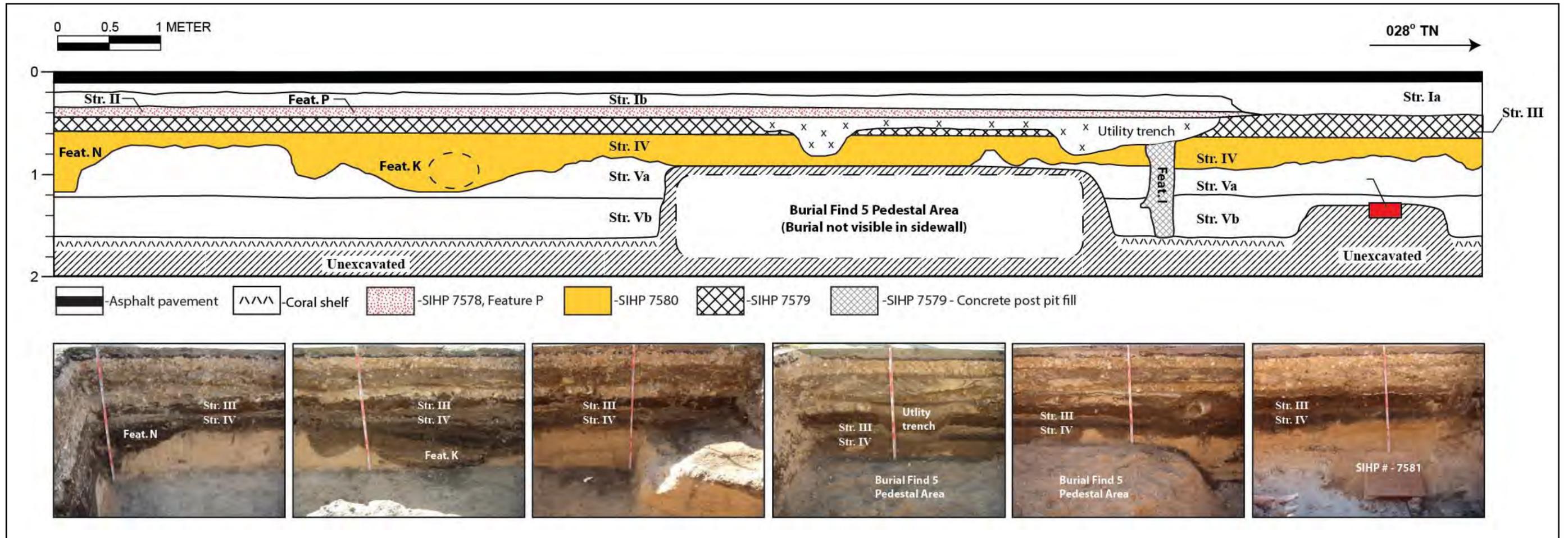


Figure 174. TE 40D, stratigraphic profile and photographs of west sidewall

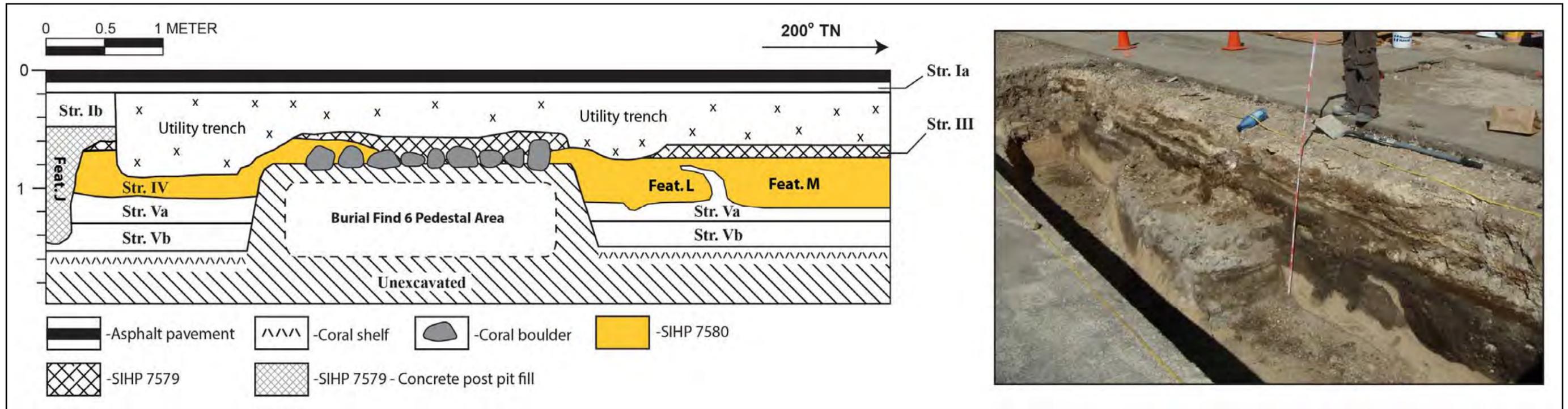


Figure 175. TE 40D, stratigraphic profile and photograph of east sidewall (note only *makai* (southern) half of excavation was profiled)

Figure 176. TE 40D (a) cross-section, (b) profile of cross section wall, and (c) plan view

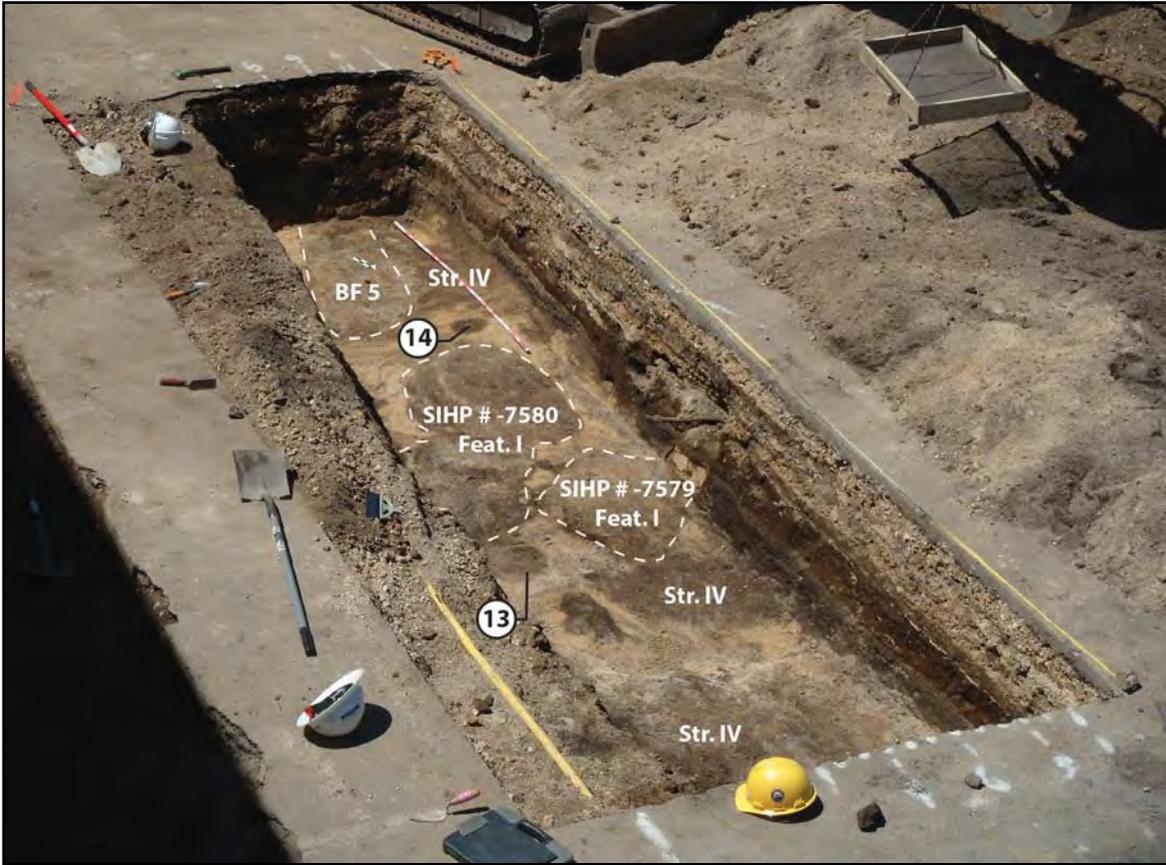


Figure 177. TE 40D plan view of *mauka* (north) half of excavation at a depth of 90 cmbs



Figure 178. TE 40D plan view of *makai* (south) half of excavation at a depth of 80 cmbs

Table 69. Pit Features Observed at TE 40D

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7579	I	100 cm long by 80 cm wide	50-160	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in plan view of TE 40D. Feature is truncated by utility pit and intrudes through Strata IV into Vb.	Concrete column and base	Historic building foundation
-7579	J	30 cm in profile	55-145	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in East sidewall of TE 40D. Feature is truncated by Stratum Ib and a utility pit and intrudes through Strata III, IV, Va, and Vb.	None observed	Historic building foundation
-7580	I	180 cm long by 90 cm wide	90-115	Strata IV and VA sediments	Amorphous-shaped pit feature observed in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. A 10-gallon sample was collected and screened.	Marine shell midden, fire-cracked rock (basalt), burnt coral cobbles, and sparse charcoal; charcoal and marine shell midden collected	Fire pit/Food preparation
-7580	J	35 cm diameter	80-100	Strata IV and Va sediments	Circular pit feature observed in plan view. Feature originates in Stratum IV and intrudes into Stratum Va. A 4-gallon sample was collected and screened.	Sparse marine shell midden, fire-cracked rock (basalt), and charcoal (not collected)	Fire pit/Food preparation
-7580	K	260 cm long by 140 cm wide	80-120	Strata IV and Va sediments	Amorphous-shaped pit feature observed in plan view and west sidewall of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. Sixteen gallons of sediment was collected and screened. Base of feature was lined with charred coral cobbles and pebbles.	Large concentrations of charcoal and marine shell midden; a gourd stopper (shell) and calcium carbonate crystalline cobble manuport also observed; all cultural material collected from sample area	Fire pit/Food preparation

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	L	155 cm long by 140 cm wide	80-100	Strata IV and Va sediments	Amorphous-shaped pit feature observed in plan view of TE 40D.  Feature originates in Stratum IV and intrudes into Stratum Va. An 8-gallon sediment sample was collected and screened.	Sparse marine shell midden, charcoal and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
-7580	M	80 cm long by x 30 cm wide	75-110	Strata IV and Va sediments	Semi-circular shaped pit feature in plan view and bowl-shaped pit feature in east sidewall of TE 40D.  Feature originates in Stratum IV and intrudes into Stratum Va.	Sparse charcoal and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
-7580	N	170 cm long by 50 cm wide	90-110	Strata IV and Va sediments	Amorphous-shaped pit feature in plan view of TE 40D.  Feature originates in Stratum IV and intrudes into Stratum Va.	Sparse marine shell midden and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
-7580	Subfeature 13	45 cm diameter	85-95	Strata IV and Va sediments	Circular-shaped pit feature observed in plan view of TE 40D.  Feature originates in Stratum IV and intrudes into Stratum Va. A 3-gallon sediment sample was collected and screened.	None observed	Postmold
-7580	Subfeature 14	20 cm diameter	90-100	Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40D.  Feature originates in Stratum IV and intrudes into Stratum Va. A 1-gallon sediment sample was collected and screened.	None observed	Postmold

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
-7580	Subfeature 15	20 cm diameter	80-90	Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40D.  Feature originates from base of Str. IV and intrudes into Stratum Va. The entire feature was screened (approx. 1 gallon).	None observed	Postmold
-7580	Subfeature 16	10 cm by 10 cm	80-90	Strata IV and Va sediments	Square-shaped pit feature observed in plan view.  Feature originates at base of Str. IV and intrudes into Str. Va. The entire feature was screened (approx. 1.5 gallons).	None observed	Postmold

160 cm below the existing surface. A square concrete block was observed at the base of the pit, with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature J was observed within the east sidewall of TE 40D (see Figure 175, Figure 179, and Table 69). It consists of an in-filled builder's pit that was truncated by Stratum Ib and a modern utility pit, and was intrusive through Strata III, IV, Va and into Vb. The feature measured 30 cm wide in profile and extended from 55 to 145 cm below the existing surface. While a concrete base and column were not observed (believed to be present beyond the extent of the excavation) the feature's size, shape provenience, and pit fill all suggest SIHP # -7579, Feature T is a historic building foundation.

Stratum IV consists of a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. A clay tobacco pipe stem and a ceramic fragment were collected from the top 10 cm of the stratum. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Also present were a bone awl and a basalt core stone (see Figure 176 for artifact provenience). Stratum IV is considered a cultural layer and has been designated as a component of SIHP # -7580.

Ten subsurface pit features were identified associated with Stratum IV (see Figure 176 through Figure 178, and Table 69). These pits are designated as SIHP # -7580, Features I through N, and as Subfeatures 13 through 16.

SIHP # -7580, Feature I was observed within plan view of TE 40D (see Figure 176 and Figure 180). The pit originated within Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The pit measured 180 cm long by 90 cm wide in plan view and extended from 90 to 115 cm below the existing surface. A 10-gallon sediment sample was collected and screened to identify cultural material and to gather additional data regarding its function. Marine shell midden, charcoal, fire-cracked rock (basalt), and burnt coral cobbles were observed. Only the midden and charcoal were collected for analysis (see Section 5 Results of Laboratory Analysis). Based on its shape, size, and contents, it is believed SIHP # -7580, Feature I is a fire pit utilized for food preparation.

SIHP # -7580, Feature J was observed in plan view of TE 40D (see Figure 176 and Figure 181). The pit feature originated within Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 35 cm diameter and extended from 80 to 100 cm below the existing surface. A 4-gallon sediment sample was collected and screened to identify cultural material and to gather additional data towards determining its function. Sparse marine shell midden, charcoal, and fire-cracked rock (basalt) were observed, but not collected. Based on its shape, size, and contents, it is believed SIHP # -7580, Feature J is a fire pit.

SIHP # -7580, Feature K was observed in plan view and in the west sidewall of TE 40D (see Figure 174, Figure 176, and Figure 178). The pit originated within Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 260 cm long by 140 cm wide in plan view and extended from 80 to 120 cm below the existing surface. The base of the feature was lined with charred coral cobbles and pebbles, with large chunks of charcoal atop



Figure 179. TE 40D, SIHP # -7579, Feature J



Figure 180. TE 40D, SIHP # -7580, Feature I



Figure 181. TE 40D, SIHP #-7580, Feature J

them. A 16-gallon sediment sample was collected and screened to identify cultural material and to gather additional data towards determining its function. A large quantity of marine shell midden and charcoal was observed and collected, in addition to fire-cracked rock (basalt), burnt coral cobbles, a gourd stopper (shell), and a calcium carbonate crystalline cobble manuport (see Section 5 Results of Laboratory Analysis). Based on its shape, size, and contents, SIHP # -7580, Feature K is interpreted as a fire pit utilized for food preparation.

SIHP # -7580, Feature L was observed in plan view and in the east sidewall of TE 40D (see Figure 175, Figure 176, and Figure 178). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 155 cm long by 145 cm wide in plan view and extended from 80 to 100 cm below the existing surface. An 8-gallon sediment sample was collected and screened to identify cultural material and to gather additional data towards determining its function. Sparse marine shell midden, charcoal, and fire-cracked rock (basalt) were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature L is interpreted as a fire pit.

SIHP # -7580, Feature M was observed in plan view and in the east sidewall of TE 40D (see Figure 175, Figure 176, and Figure 178). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 80 cm long by 30 cm wide in plan view and extended from 75 to 110 cm below the existing surface. A 5-gallon sediment sample was collected and screened to identify cultural material and to gather additional data towards determining its function. Sparse marine shell midden, charcoal, and fire-cracked rock (basalt) were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature M is interpreted as a fire pit.

SIHP # -7580, Feature N was observed in plan view and in the east sidewall of TE 40D (see Figure 175, Figure 176, and Figure 178). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 170 cm long by 50 cm wide in plan view and extended from 90 to 105 cm below the existing surface. An 8-gallon sediment sample was collected and screened to identify cultural material and to gather additional data towards determining its function. Sparse marine shell midden, charcoal, and fire-cracked rock (basalt) were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature N is interpreted as a fire pit.

Four postmolds were identified as originating from within Stratum IV (cultural layer) and intruding into Stratum Va (Jaucas sand). The postmolds consisted of three circular pits (SIHP # -7580, Subfeatures 13, 14, and 15) and one square pit (SIHP # -7580, Subfeature 16). All were observed in the floor of TE 40D (see Figure 176 through Figure 178). The diameter of the circular pit features ranged from 20 to 45 cm. The square pit measured 10 cm by 10 cm in plan view. The postmolds were identified at 80 cmbs (Subfeatures 15 and 16), 85 cmbs (Subfeature 13), and 90 cmbs (Subfeature 14). Each pit was completely excavated to identify cultural material and to gather additional data towards determining their function. No cultural material was observed. All four of these pits are identified as postmolds based on their defined geometric shape (either circular or square), fairly small size, vertical extent, and absence of cultural material.

During the excavation of TE 40D, three human burials were identified (SIHP # -7580, Burial Find 5 and 6 and SIHP # -7581). Burial Find 5 consists of an intact coffin burial. The burial pit

for Burial Find 5 intrudes through Stratum IV (SIHP # -7580, cultural layer) into Stratum Vb (marine clay) (see Figure 176). The upper limits of the burial pit, observed at 60 cmbs, was truncated by Stratum III. The burial pit was only visible in the south sidewall (see Figure 176). The base of the burial pit was not exposed. As such, it is unknown whether the pit terminates in Stratum Vb or at the top of the coral shelf. The rectangular burial pit measured 185 cm long by 70 cm wide, and was observed from 60 to 140 cm below the existing surface (Figure 182). Pit fill consisted of a mixture of Strata IV and Va, and Vb.

The Burial Find 5 burial pit was partially bisected to identify the presence/absence of human skeletal remains and to gain information on burial position, orientation, age, and ethnicity. Human skeletal remains were encountered at 120 cm below the existing surface. Based on the observed remains, the burial was assumed to be within an extended supine position, with the head oriented *mauka* (northeast). A coffin outline and a bone button were observed immediately northeast of the cranium (see Figure 182). Burial Find 5 is assumed to consist of the complete skeletal remains of an adult individual.

Burial Find 6 consists of an intact coffin burial. The burial pit for Burial Find 6 originates within Stratum IV (SIHP # -7580, cultural layer) and extends into Stratum Vb (marine clay) (see Figure 175). The burial pit is rectangular in shape and measured approximately 280 cm long by 100 cm wide, and was observed from 60 to 120 cm below the existing surface (Figure 183 and Figure 184). Pit fill consisted of a mixture of Strata IV, Va and Vb. Of note was the presence of sixteen small, subangular coral boulders that fully capped the top of the burial pit (see Figure 183). The coral boulders were encountered between 60 and 90 cmbs, within Stratum IV. Also of note was the presence of a large rectangular-shaped coral block set upright behind the cranium of Burial Find SIHP # -7581 (see Figure 183). These small coral boulders appear to have functioned as a surface marker delineating the horizontal extent of the burial.

A small test excavation (50 cm by 50 cm) into the southeast end of the Burial Find 6 burial pit served to identify the presence/absence of human skeletal remains and to obtain information on burial position, orientation, age, and ethnicity. Human skeletal remains were encountered at 110 cm below the existing surface. Based on the limited observations, the burial was assumed to be within an extended supine position, with the head oriented *makai* (southwest). No coffin outline, coffin hardware, or burial goods were observed within the small test area. Burial Find 6 consists of the complete skeletal remains of an adult individual.

SHIP # -7581 consists of an intact bundle burial. The burial pit was very subtle and was visible only in plan view. The burial pit originates in Stratum Va (culturally sterile Jaucas sand) and extends into Stratum Vb (marine clay) (Figure 185). The burial pit is circular in shape and measures approximately 50 cm in diameter, and was observed from 135 to 160 cm below the existing surface. Pit fill consisted of a mixture of Strata Va and Vb.

Observed skeletal elements comprising SIHP # -7581 included arm and leg long bones (femur, tibia, humerus, ulna, etc.) and ribs (see Figure 185). It is believed all other skeletal elements (cranium, vertebrae, phalanges, etc.) are likely present beneath the meticulously stacked and sorted long bones. The human skeletal remains were encountered at 140 cm below the existing surface. SIHP # -7581 likely comprises the complete skeletal remains of an adult individual.

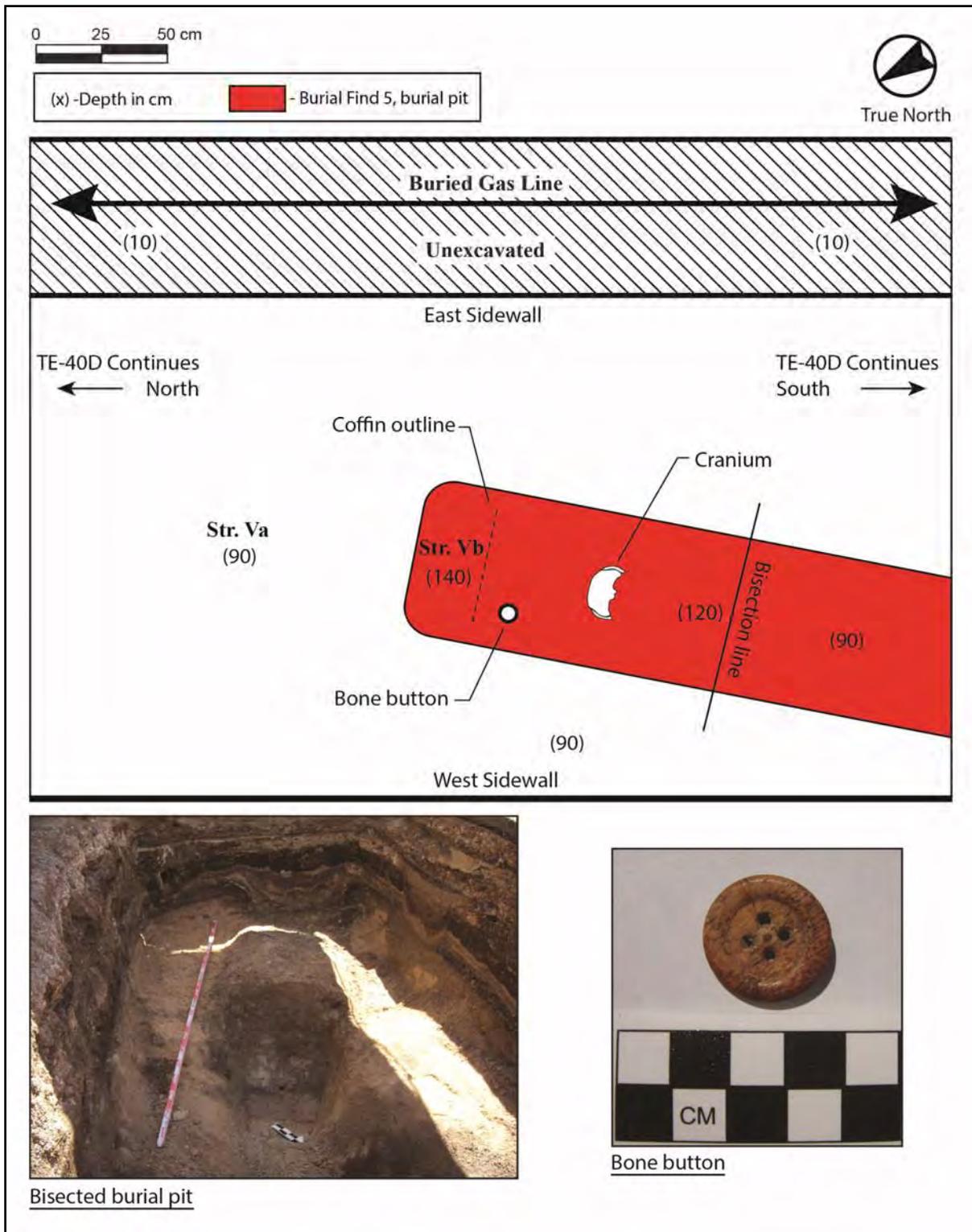


Figure 182. Plan view (top) and photo (lower left) of SIHP # -7580, Burial Find 5, and photo of bone button found in burial pit at 120 cms

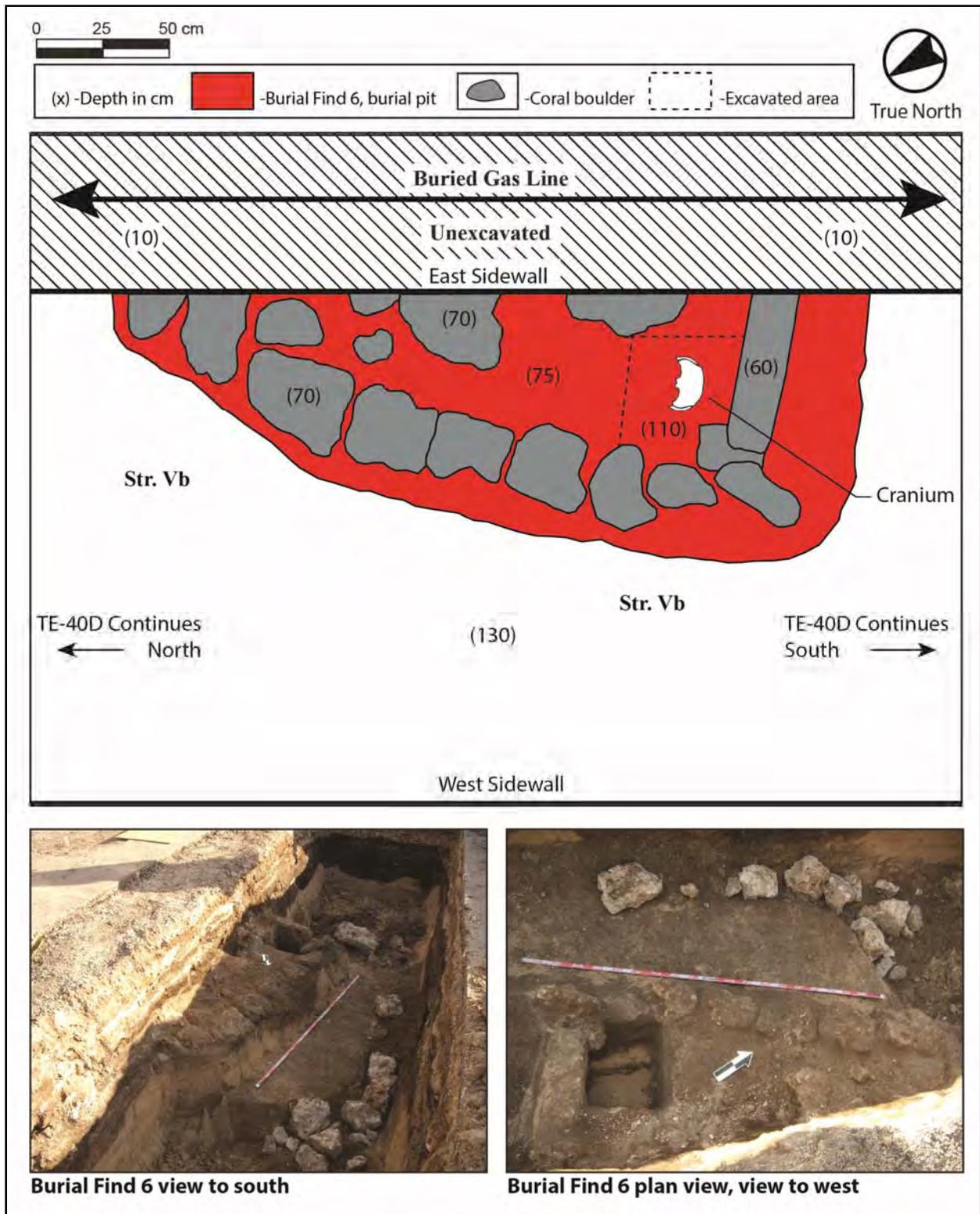
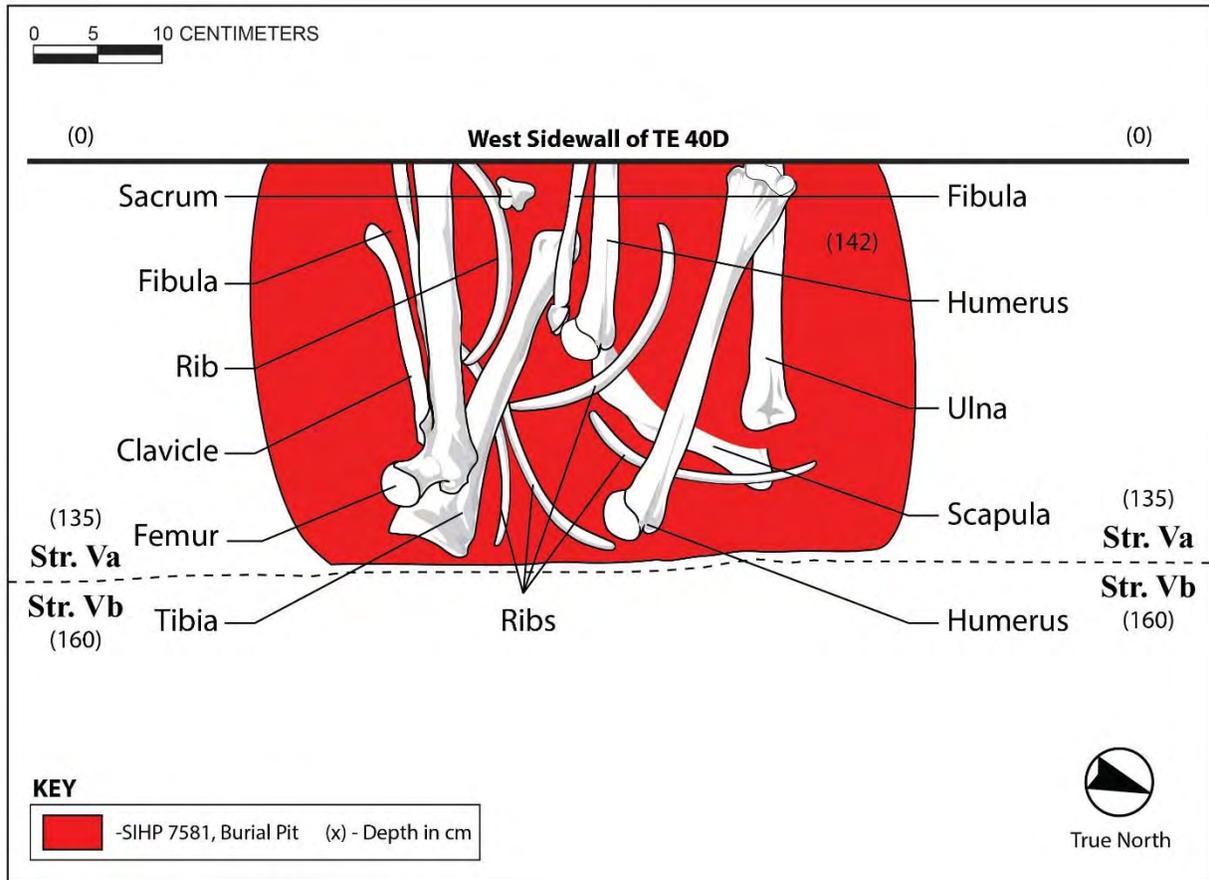


Figure 183. Plan view (top) and photos to the south (lower left) and northwest (lower right) of SIHP # -7580, Burial Find 6



Figure 184. Photograph of east sidewall showing Burial Find 6 pedestal area, view to northeast



**TE 40D West Sidewall**

Figure 185. Plan view of SIHP # -7581 (top) and photo of burial location view to the west (bottom)

Following investigation and documentation, Burial Finds 5 and 6, and SHIP # -7581 were secured by covering them with muslin, clean sand, and a plywood board. TE 40D was then backfilled and paved over with asphalt.

## 4.2.2.49 Test Excavation 40E

<b>Length:</b>	4m
<b>Width:</b>	4m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40E (TE 40E) (Table 70, Figure 186 through Figure 191) consists of modern fill (Stratum I), a crushed coral pavement (Stratum IIa), historic land reclamation fill (Stratum IIb), historic fill (Stratum III), a culturally-enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia and Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum IIa consists of a crushed coral pavement. Stratum IIb consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 40E indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40E ceased at 1.55 m below the existing surface upon encountering limestone bedrock.

Of note is Stratum IIa, a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.

SIHP # -7578, Feature K consists of an oblong pit feature observed in plan view of TE 40E (Figure 192 through Figure 194, and Table 71). The pit intruded through Stratum IIa, IIb, III, IV, and into Stratum Va. It measured 90 cm long by 50 cm wide, and extended from 35 to 105 cm below the existing surface. The entire feature was excavated to identify cultural content and to determine its function. The pit fill consisted of a mixture of Strata IIa, IIb, III, IV, and Va sediments. Observed cultural material consisted of glass milk bottles, a bone button, a slate pencil, a glass vial, and a copper handle (see Section 5 Laboratory Analysis). Based on its stratigraphic provenience and cultural content, SIHP # -7578, Feature X is interpreted as a historic trash pit.

Also of interest is Stratum III, a localized fill deposit. This fill layer has been designated as a component of SIHP # -7579.

Four concrete building foundations (SIHP # -7579, Features K, L, M, and N) were identified in TE 40E. In general, these foundations are square concrete bases (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. Each foundation column was installed by excavating a large builder's pit through Stratum III down to the coral shelf. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular columns likely extending slightly above Stratum III. Subsequent fill events have buried these columns.

SIHP # -7579, Feature K was observed within the south sidewall of TE 40E and in plan view

Table 70. Strata Observed at Test Excavation 40E

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	20-35	10YR 5/1, gray; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	35-40	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
IIb	40-50	10YR 3/2, very dark grayish brown; sandy silt loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is identified as historic land reclamation fill.
N/A	40-97	Modern utility pit. Pit fill is a mixture of Strata III through Va sediments.
III	50-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; crushed red brick observed within stratum (not collected). This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.

Stratum	Depth (cmbs)	Description
IV	70-100	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal; buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP # -7580.
Va	80-130	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
Vb	110-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock); Zone 1.

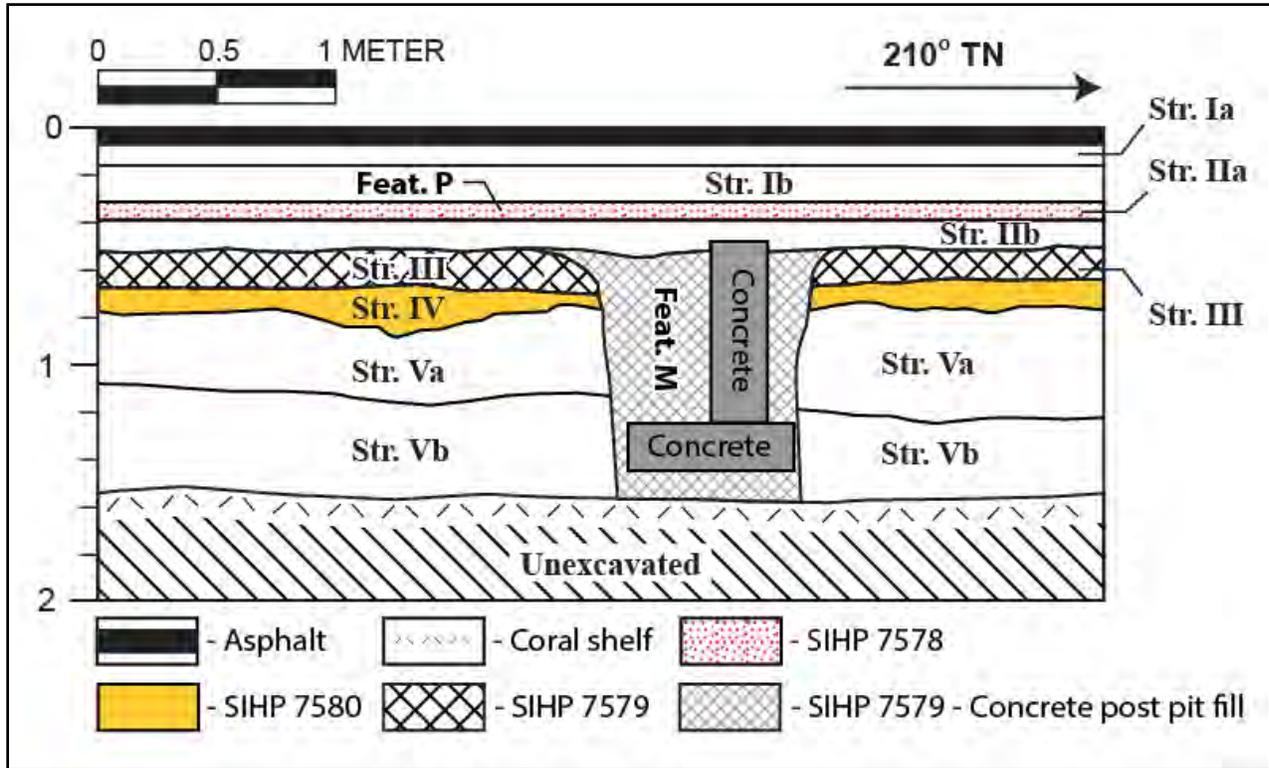


Figure 186. TE 40E, stratigraphic profile of east sidewall



Figure 187. TE 40E, photograph of east sidewall (SIHP # -7579, Feature M shown)

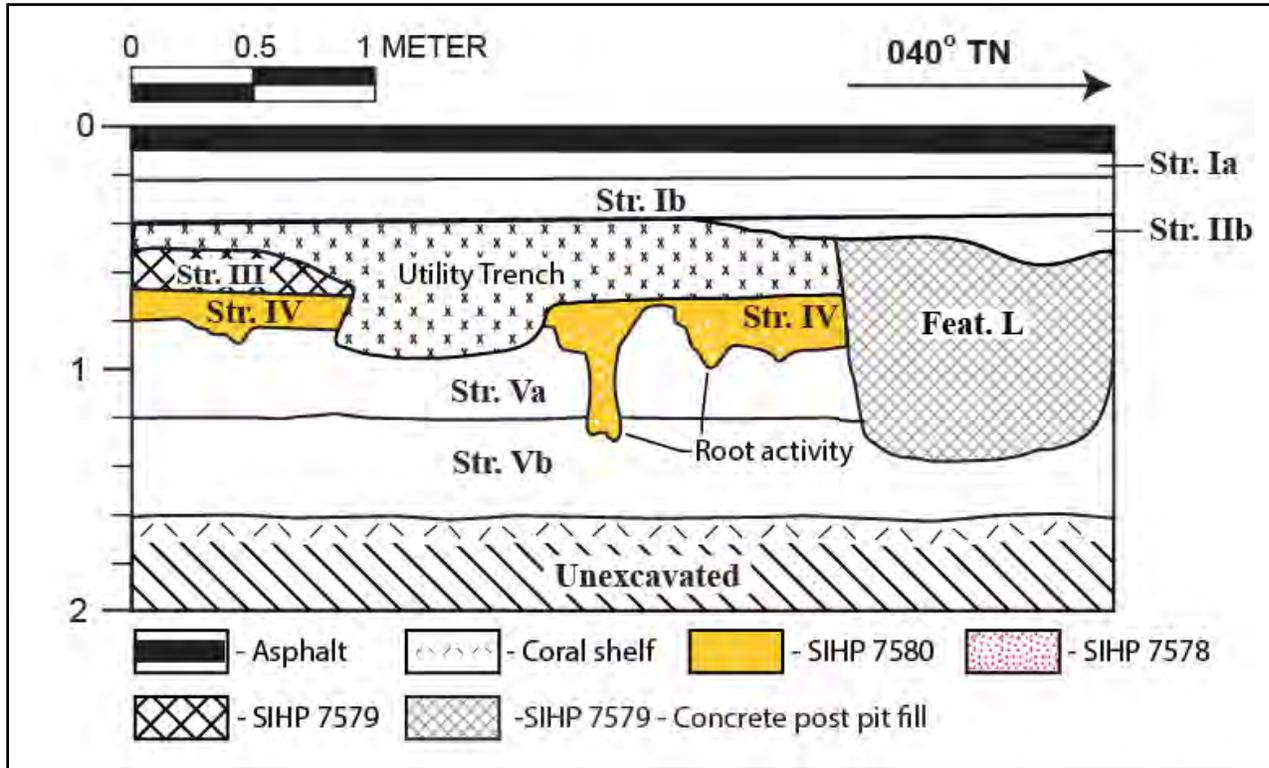


Figure 188. TE 40E, stratigraphic profile of west sidewall



Figure 189. TE 40E, photograph of west sidewall (SIHP # -7579, Feature L shown)

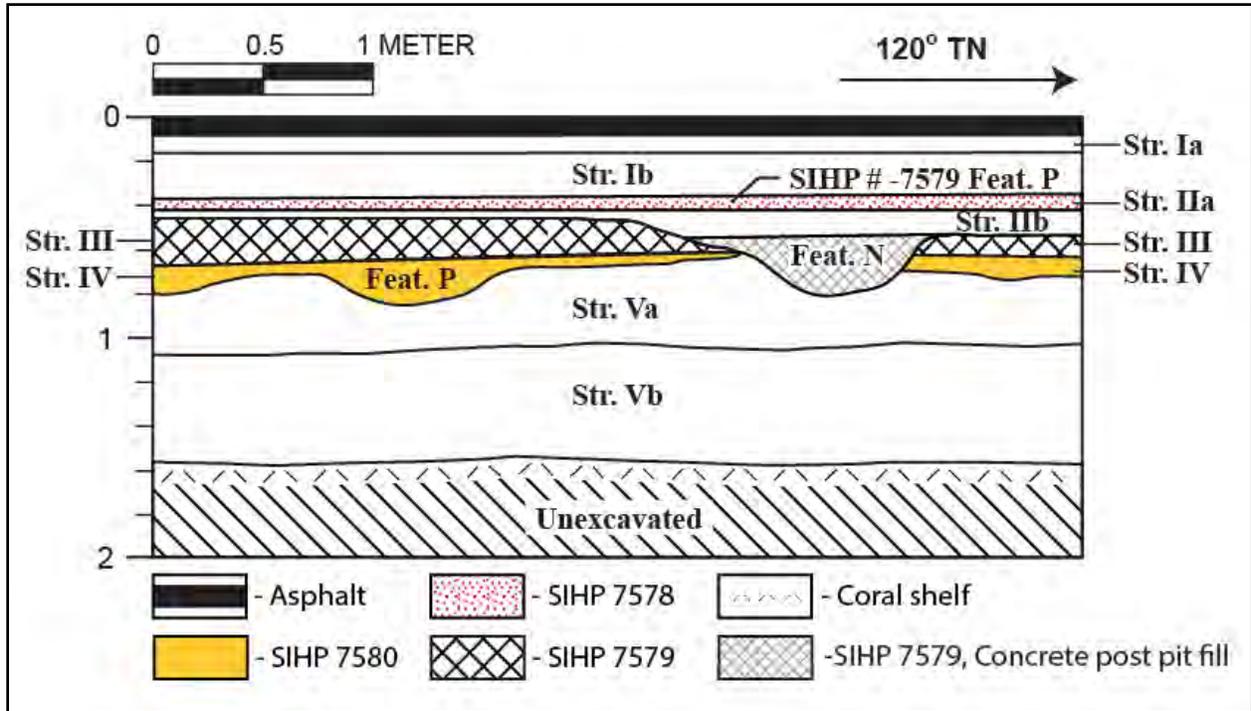


Figure 190. TE 40E, stratigraphic profile of north sidewall



Figure 191. TE 40E, photograph of north sidewall (SIHP # -7580, Feature P shown)

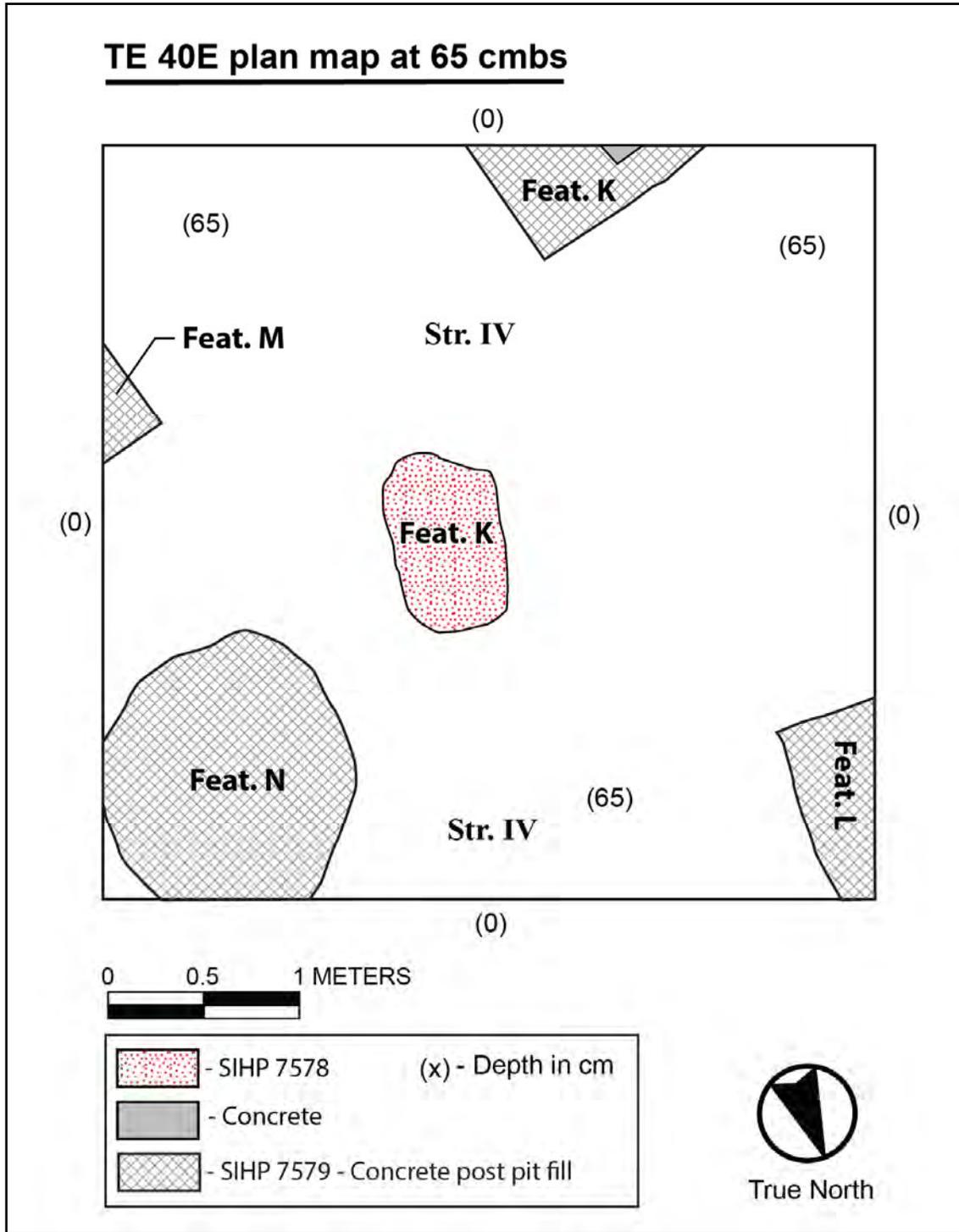


Figure 192. TE 40E plan view at 65 cmbs



Figure 193. Photograph of SIHP # -7578, Feature K, view to southwest



Figure 194. TE 40E, SIHP # -7579, Feature K

Table 71. Pit Features Observed at TE 40E

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	K	90 cm long by 50 cm wide	35-105	Mixture of Strata IIa, IIb, III, IV, and Va sediments	Oblong pit feature observed in plan view of TE 40E. The feature intrudes through Strata IIa, IIb, III, IV, and Va. The upper portion of the feature was truncated by Stratum Ib.	Glass milk bottles, bone button, slate pencil, glass vial, and a copper handle	Trash pit
-7579	K	60 cm by 50 cm	60-160	Mixture of Strata IIb, III, IV, Va and Vb sediments	Square-shaped pit feature observed in TE 40E plan view and in south sidewall. The feature is truncated by Stratum IIb and terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
-7579	L	110 cm by 50 cm	50-140	Mixture of Strata II, III, IV, and Vb sediments	Square-shaped pit feature observed in TE 40E plan view and in west sidewall. The upper limit of the pit is truncated by Stratum IIb and the base terminates in Stratum Vb. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
-7579	M	40 cm by 30 cm	50-160	Mixture of Strata III, IV, and V sediments	Square-shaped pit feature observed in TE 40E plan view and in east sidewall. The feature is truncated by Stratum IIb and the base terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
-7579	N	140 cm diameter	70-160	Mixture of Strata III, IV, Va and Vb sediments	Circular pit feature observed in TE 40E plan view and in north sidewall. The feature is truncated by Stratum IIb and terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	O	320 cm by 260 cm	80-95	Mixture Strata of Str. IV and Va sediments	Observed in plan view of TE 40E; two linear features connected by three postmolds, forming a 90 degree angle; outline of a semi-circle extends from the northern edge of the feature.  The pit feature originates in Stratum IV and intrudes into Stratum Va.	Charcoal observed in postmolds	Unknown (possible outline of a surface structure)
-7580	P	40 cm diameter	75-90	Mixture Strata IV and IVa sediments	The feature is bowl-shaped in north sidewall and circular in plan view of TE 40E.  The pit feature originates in Stratum IV and intrudes into Stratum Va.	Marine shell midden, charcoal, and basalt fire-cracked rock	Fire pit/Food preparation

(see Figure 192, Figure 194, and Table 71). It consists of an in-filled builder's pit containing a historic building foundation remnant. The pit measured 60 cm by 50 cm in plan view and extended in profile from 60 to 160 cm below the existing surface, down to the coral shelf. A square concrete block was observed at the base of the pit feature, atop the coral shelf, with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature L was observed within the west sidewall of TE 40E and in plan view (see Figure 188, Figure 189, Figure 192, and Table 71). It consists of an in-filled builder's pit. The pit measured 110 cm by 50 cm in plan view and extended in profile from 50 to 140 cm below the existing surface. The concrete building foundation remnants associated with this pit were not observed, but may be present beyond the western sidewall of the test excavation.

SIHP # -7579, Feature M was observed within the east sidewall of TE 40E and in plan view (Figure 186, Figure 187, Figure 192, and Table 71). It consists of an in-filled builder's pit containing a historic building foundation remnant. The pit measured 40 cm by 30 cm in plan view and extended in profile from 50 to 160 cm below the existing surface. A square concrete block was observed at the base of the pit feature, atop the coral shelf, with a rectangular concrete column freestanding atop the square block.

SIHP # -7579, Feature N was observed in plan view of TE 40E (see Figure 192 and Table 71). It consists of a circular in-filled builder's pit containing a historic building foundation remnant. The pit measured 140 cm in diameter and extended from 70 to 160 cm below the existing surface. A square concrete block was observed at the base of the in-filled pit, atop the coral shelf, with a rectangular concrete column freestanding atop the square block.

Stratum IV is a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. All observed cultural material was noted, but not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

Two features (SIHP # -7580, Features O and P) were observed as originating in Stratum IV. SIHP # -7580, Feature O was observed in plan view of TE 40E (Figure 195, Figure 196, and Table 71). It consisted of two linear features connected by four postmolds, forming a 90 degree angle. An outline of a semi-circle extends from the northern edge of the feature. The entire feature, the 90 degree angle and semi-circle, measure approximately 320 cm by 260 cm, and were observed from 80 to 95 cm below the existing surface. The four postmolds associated with this feature have an average diameter of 20 cm, and were observed from 80 to 110 cm below the existing surface. No cultural material was present within SIHP # -7580, Feature O with the exception of charcoal collected at the base of the northern-most postmold. The size and shape of this feature, along with the presence of multiple associated postmolds suggests SIHP # -7580, Feature O may be the outline of a possible structure of unknown function.

SIHP # -7580, Feature P was observed in the north sidewall and in plan view of TE 40E (Figure 190, Figure 191, Figure 195, and Table 71). It consisted of a circular pit measuring 40 cm in diameter and extending from 75 to 90 cm below the existing surface. The entire feature

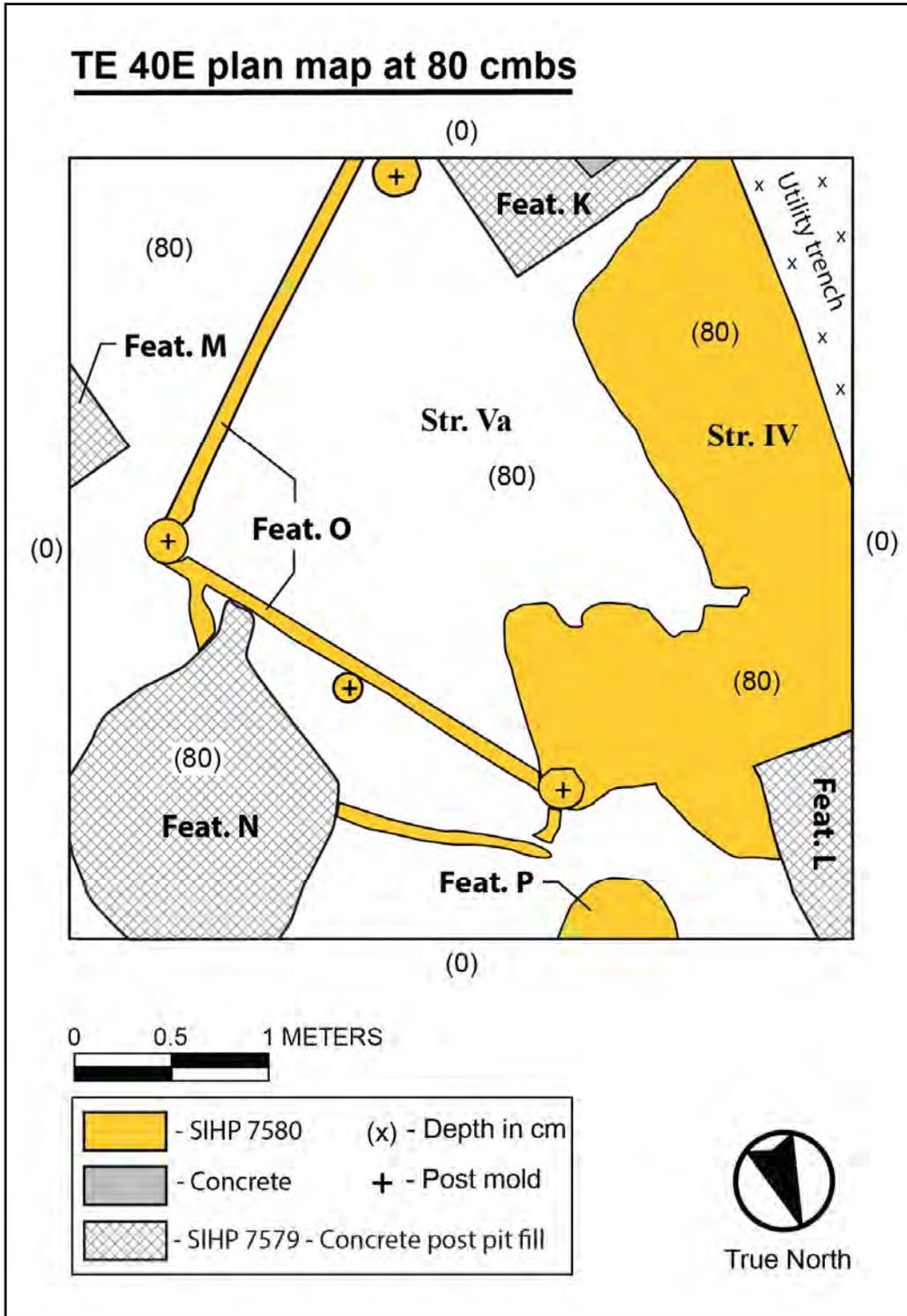


Figure 195. TE 40E plan view at 80 cmbs



Figure 196. TE 40E excavation plan view showing SIHP # -7580, Feature O

was excavated to identify cultural content and to better define its function. Marine shell midden, charcoal, and fire-cracked rock (basalt) were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature P is identified as a fire pit utilized for food preparation.

## 4.2.2.50 Test Excavation 40F

<b>Length:</b>	14m
<b>Width:</b>	2.5m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40F (TE 40F) (Table 72 and Figure 197) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia and Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III (Strata IIIa and IIIb) consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 40F indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40F ceased at 1.6 m below the existing surface upon encountering limestone bedrock.

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

Also of interest are Strata IIIa and IIIb, localized fill deposits. These fill layers have been designated as components of SIHP # -7579.

Stratum IV consists of a buried A horizon that developed atop the Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The cultural material was similar to that documented and collected from this deposit in nearby trenches, so was not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

Six pit features (SIHP # -7580, Feature K and Features Q–U) were observed as originating in Stratum IV (Figure 198 and Table 73). SIHP # -7580, Feature K consists of a large rectangular pit observed in plan view of TE 40F, as well as in plan view and in the west profile of TE 40D (see Figure 174, Figure 176, and Figure 198). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 400 cm long by 240 cm wide and extended from 80 to 120 cm below the existing surface. The base of the feature was lined with charred coral cobbles and pebbles, with large chunks of charcoal atop them. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. A large quantity of marine shell midden and charcoal was noted, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature K is identified as a fire pit utilized for food preparation.

SIHP # -7580, Feature Q consists of an amorphous pit observed in plan view and in the west

Table 72. Strata Observed at Test Excavation 40F

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
N/A	19-64	Modern utility pit. Pit fill is a mixture of Strata Ib through IIIb sediments.
Ib	20-30	10YR 5/1, gray; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	30-45	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
IIIa	45-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; crushed red brick observed within stratum (not collected). This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IIIb	45-65	10YR 7/2, light gray; clay; structureless, massive; moist, firm consistency; plastic; mixed origin; slightly plastic; very abrupt lower boundary; wavy topography. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.

Stratum	Depth (cmbs)	Description
IV	60-115	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal; buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP #-7580.
Va	70-120	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
Vb	120-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock); Zone 3.

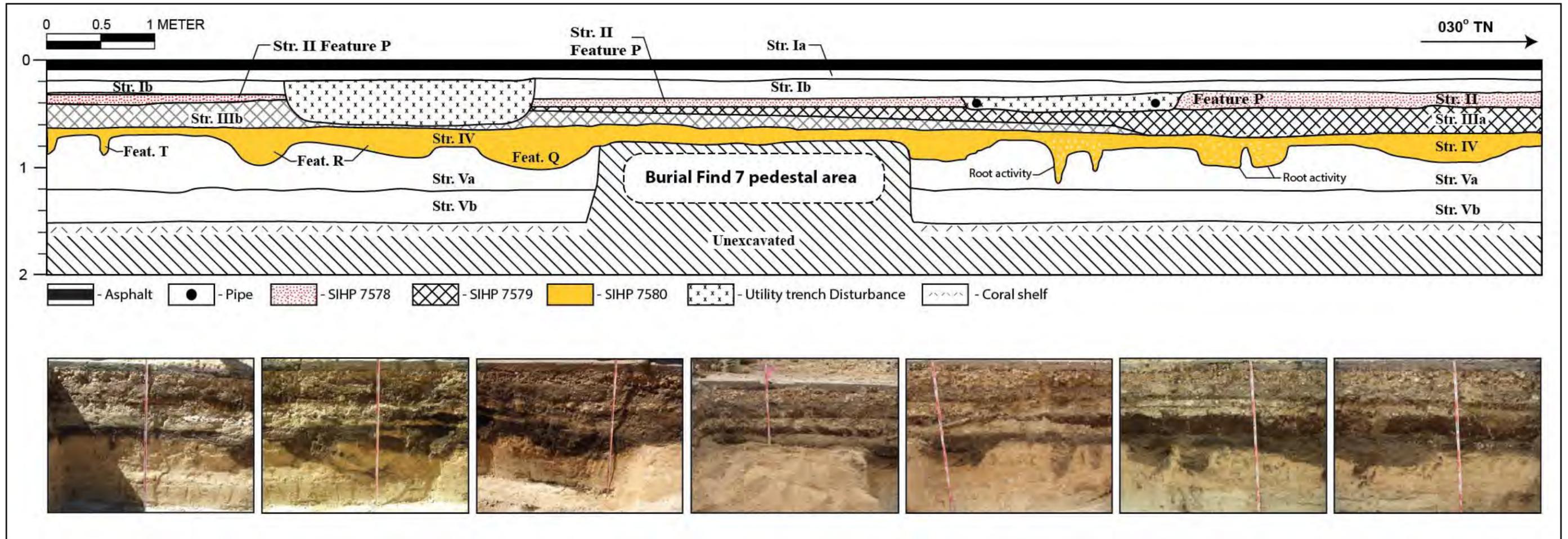


Figure 197. TE 40F, stratigraphic profile of west sidewall



Figure 198. TE 40F plan view

Table 73. Pit Feature Observed at TE 40F

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	K	400 cm long by 240 cm wide	80-120	Mixture of Strata IV and Va sediments	Amorphous-shaped pit feature observed in plan view of TE 40F; also observed in plan view and in west sidewall of TE 40D. Feature originates from Stratum IV and intrudes into Stratum Va. Sixteen gallons of sediment were collected and screened. Base of feature was lined with charred coral cobbles and pebbles.	Large concentrations of charcoal and marine shell midden (not collected)	Fire pit/Food preparation
-7580	Q	100 cm by 110 cm	70-90	Mixture of Strata IV and Va sediments	Amorphous pit feature observed in plan view and west sidewall of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened.	Marine shell midden, <i>kukui</i> nut shell, charcoal, and fire-cracked rock (basalt) (collected)	Fire pit/Food preparation
-7580	R	120 cm diameter	70-100	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and profile of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. Ten-gallon sample was collected and screened.	Charcoal, marine shell midden, and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
-7580	S	55 cm diameter	75-105	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. A 15-gallon sample was collected and screened.	A basalt flake, dog tooth, marine shell midden, and charcoal (collected)	Fire pit/Food preparation
-7580	T	10 cm by 160 cm	75-85	Mixture of Strata IV and Va sediments	Linear pit feature observed in plan view of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. Sampled but no cultural material observed.	No cultural material observed	Unknown (possible outline of a former structure)

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	U	110 cm by 120 cm	75-90	Mixture of Strata IV and Va sediment	Amorphous pit feature observed in plan view of TE 40F. The pit originates in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). A ten-gallon sample collected and screened.	Glass fragments, sparse charcoal, fire-cracked rock (basalt), slag and marine shell midden (not collected)	Fire pit/Food preparation

profile of TE 40F (see Figure 197, Figure 198, and Table 73). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 100 cm by 110 cm and extended from 70 to 90 cm below the existing surface. A 5-gallon sediment sample was collected and screened to identify cultural material and to gather additional data for determining its function. Marine shell midden, charcoal, fire-cracked rock (basalt), and *kukui* nut shell were observed and collected (see Section 5 Results of Laboratory Analysis). Based on its shape, size, and contents, SIHP # -7580, Feature Q is identified as a fire pit utilized for food preparation.

SIHP # -7580, Feature R consists of a circular pit observed in plan view and in the west profile of TE 40F (see Figure 197, Figure 198, and Table 73). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 120 cm in diameter and extended from 70 to 100 cm below the existing surface. A 10-gallon sediment sample was collected and screened to identify cultural material and to gather additional data for determining its function. Marine shell midden, charcoal, and fire-cracked rock (basalt) were observed. The charcoal was collected. Based on its shape, size, and contents, SIHP # -7580, Feature Q is identified as a fire pit for food preparation.

SIHP # -7580, Feature S consists of a circular pit observed in plan view of TE 40F (see Figure 198 and Table 73). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 55 cm in diameter and extended from 75 to 105 cm below the existing surface. A 15-gallon sediment sample was collected and screened to identify cultural material and to gather additional data for determining its function. A basalt flake, dog tooth, marine shell midden, charcoal, and fire-cracked rock (basalt) were observed and collected (see Section 5 Results of Laboratory Analysis). Based on its shape, size, and contents, SIHP # -7580, Feature Q is identified as a fire pit utilized for food preparation.

SIHP # -7580, Feature T consists of a linear pit observed in plan view and in the west profile of TE 40F (see Figure 197 through Figure 199, and Table 73). The pit originates in Stratum IV (cultural layer) and intrudes into Stratum Va (Jaucas sand). The feature measured 160 cm by 10 cm and extended from 75 to 85 cm below the existing surface. The entire feature was excavated to identify cultural content and to better define its function. No cultural material was observed. The function of SIHP # -7580, Feature T is unknown, but based on its similarities to SIHP # -7580, Feature O it is hypothesized that this feature may represent the outline of a former structure.

SIHP # -7580, Feature U consists of an amorphous pit observed in plan view in TE 40F (see Figure 198 and Table 73). The pit originates in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 110 cm by 120 cm and extended from 75 to 90 cm below the existing surface. A 10-gallon sediment sample was collected and screened to identify cultural material and to better determine its function. Glass fragments, slag, marine shell midden, charcoal, and fire-cracked rock (basalt) were noted, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature Q is interpreted as a fire pit for food preparation.

During the excavation of TE 40F, two human burials were identified (SIHP # -7580, Burial Finds 7 and 8). Burial Find 7 consists of an intact coffin burial. The burial pit for Burial Find 7 originates in Stratum IV (SIHP # -7580, cultural layer) and is intrusive into Stratum Vb (marine



Figure 199. TE 40F plan view, SIHP # -7580, Feature T

clay). The burial pit is rectangular in shape and measures approximately 210 cm long by 60 cm wide, and was observed from 70 to 150 cm below the existing surface (Figure 200). Pit fill consisted of a mixture of Strata IV, Va and Vb sediments.

The Burial Find 7 consists of an intact coffin burial. The burial pit was partially bisected from 90 to 150 cmbs in order to confirm the presence/absence of human skeletal remains and to gain information on burial position, orientation, age, and ethnicity. The bisection was terminated once human skeletal remains were encountered at 150 cm below the existing surface. The burial was determined to be within an extended supine position, with the feet oriented *mauka* (northeast). A coffin outline and metal nails were observed immediately northeast of the feet (see Figure 200). Burial Find 7 is believed to comprise the complete skeletal remains of an adult individual.

Burial Find 8 consists of an intact coffin burial. The burial pit for Burial Find 8 originates in Stratum IV (SIHP # -7580, cultural layer) and is intrusive into Stratum Vb (marine clay). The burial pit is rectangular in shape and measures approximately 200 cm long by 55 cm wide, and was observed from 80 to 140 cm below the existing surface (Figure 201). Pit fill consisted of a mixture of Strata IV, Va and Vb sediments.

The Burial Find 8 burial pit was partially bisected from 86 to 143 cmbs in order to confirm the presence/absence of human skeletal remains and to gain information on burial position, orientation, age, and ethnicity. The bisection was terminated once human skeletal remains were encountered at 143 cm below the existing surface. The burial was determined to be within an extended supine position, with the feet oriented *mauka* (northeast). A coffin outline was observed immediately northeast of the feet (see Figure 201). Burial Find 8 is believed to comprise the complete skeletal remains of an adult individual.

Following investigation and documentation, Burial Finds 7 and 8 were secured by covering them with muslin, clean sand, and a plywood board. TE 40F was then backfilled and paved over with asphalt.

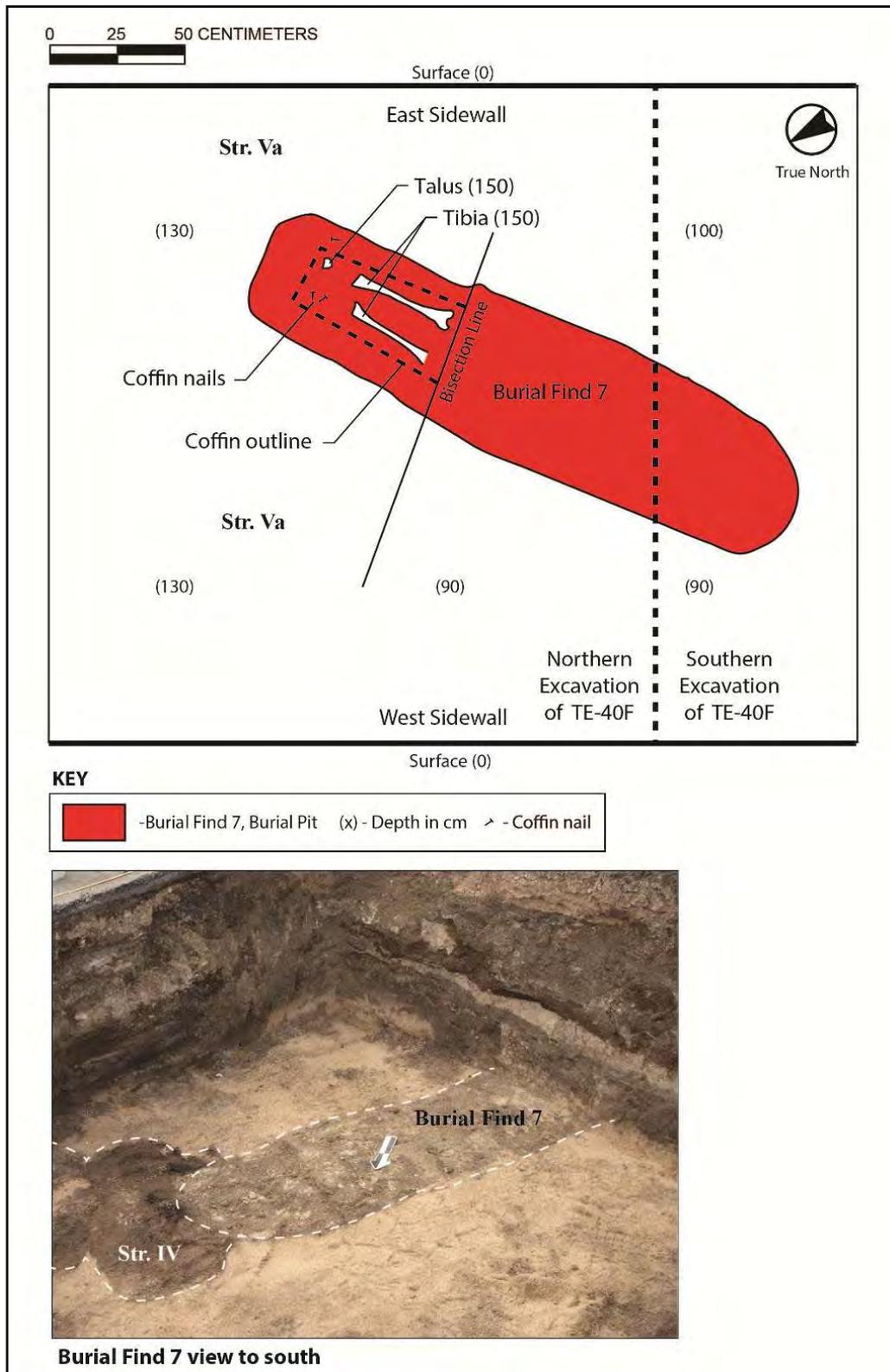


Figure 200. Plan view map (top) and photograph (bottom) of SIHP # -7580, Burial Find 7

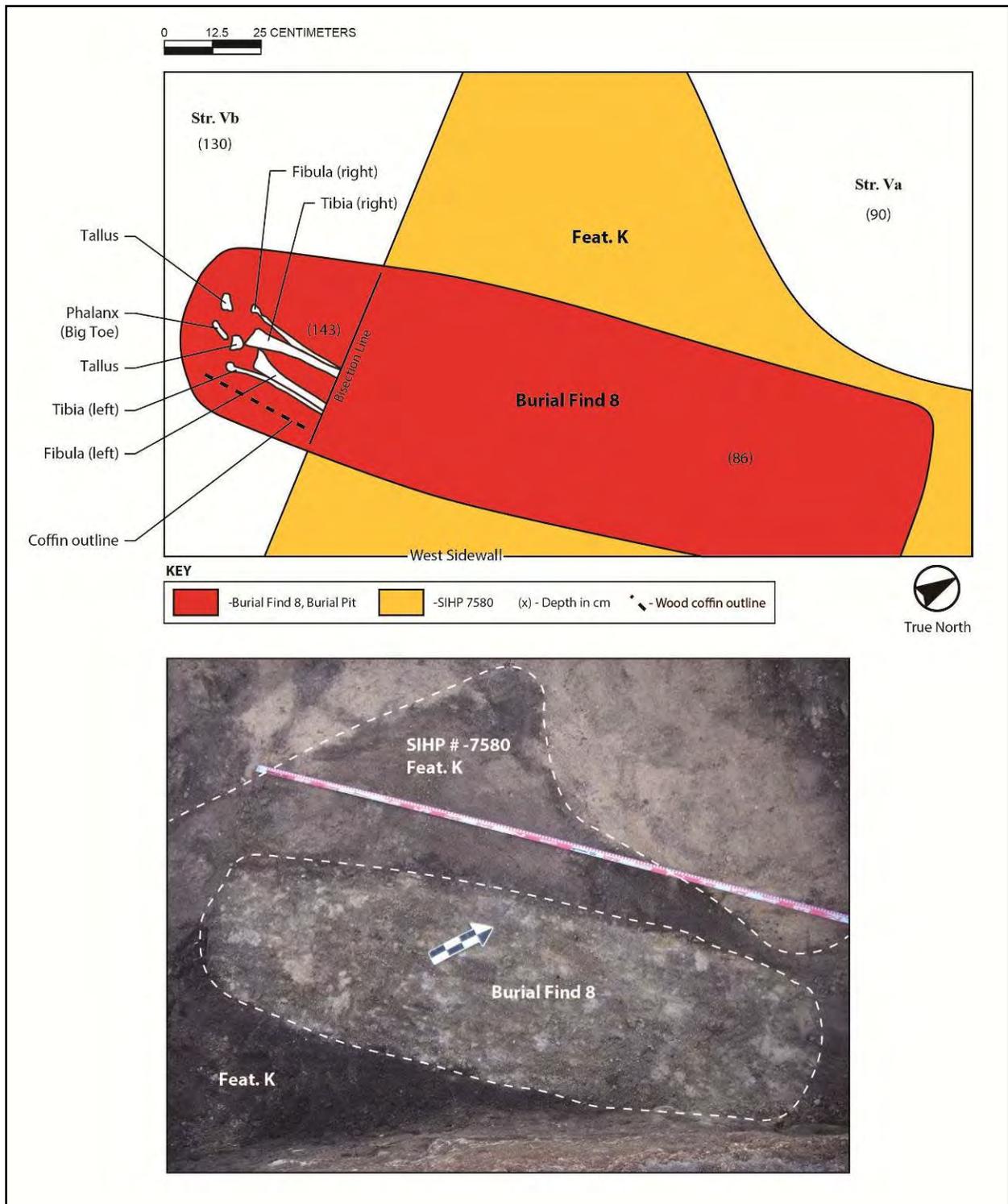


Figure 201. Plan view map (top) and photograph (bottom) of SIHP # -7580, Burial Find 8 at approximately 90 cmbs

## 4.2.2.51 Test Excavation 40G

<b>Length:</b>	10m
<b>Width:</b>	2.5m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40G (TE 40G) (Table 74, Figure 202, and Figure 203) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic fill (Stratum III), a culturally-enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia, Ib, and Ic) consists of imported fill material utilized for construction of the existing asphalt surface and underlying base courses. Stratum II consists of a crushed coral pavement. Stratum III (Strata IIIa and IIIb) consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 40G indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40G ceased at 1.5 m below the existing surface upon encountering limestone bedrock.

Of note is Stratum II, a crushed coral pavement that has been designated as Feature P and as a component of SIHP # -7578.

Also of interest are Strata IIIa and IIIb, localized fill deposits. These fill layers have been designated as components of SIHP # -7579.

During the excavation of Stratum IIIa, a partial adult human mandible (SIHP # -7583), was identified at a depth of 55 cmbs. Screening of sediments in the immediate vicinity yielded no additional human remains. The human mandible (SIHP # -7583) was determined to be isolated within the Stratum IIIa fill layer and is believed to have been imported from an off-site location. Following the documentation of TE 40G, the human remains were wrapped in muslin and placed in a small *lauhala* basket. The basket was then filled with clean sand and returned to the approximate location where the human remains were identified, specifically the northeast corner of TE 40G at approximately 90 cmbs. The excavation was then backfilled, with a small plywood board placed atop the *lauhala* basket for added protection and to act as a marker if the need arises to relocate the remains (Figure 204).

Stratum IV consists of a buried A horizon that developed atop the Jaucas sand (Stratum Va) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Faunal midden (i.g., sea turtle, fish, pig), an *aku* lure preform, a mother-of-pearl English game token, and metal, glass, and ceramic fragments were also observed. The metal fragments were noted, but not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

Table 74. Strata Observed at Test Excavation 40G

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	20-30	10YR 4/4, dark yellowish brown; silt loam; weak, fine, crumb structure; moist friable consistency; non-plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
Ic	20-40	10YR 5/2, grayish brown; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	40-50	Modern utility pit. Pit fill is a mixture of Strata Ic and II sediments.
II	30-45	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
IIIa	45-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; ceramic fragments and a glass bead observed within stratum (collected); human mandible fragment (SIHP # -7583). This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IIIb	45-65	10YR 7/2, light gray; clay; structureless, massive; moist, firm consistency; plastic; mixed origin; slightly plastic; very abrupt lower boundary; wavy topography. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.

Stratum	Depth (cmbs)	Description
IV	60-115	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contains marine shell and faunal midden, fire-cracked rock (basalt), charcoal, <i>aku</i> lure preform, mother-of-pearl English game token, metal, glass, and ceramic fragments; buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP #-7580.
Va	70-120	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	120-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock), Zone 1.

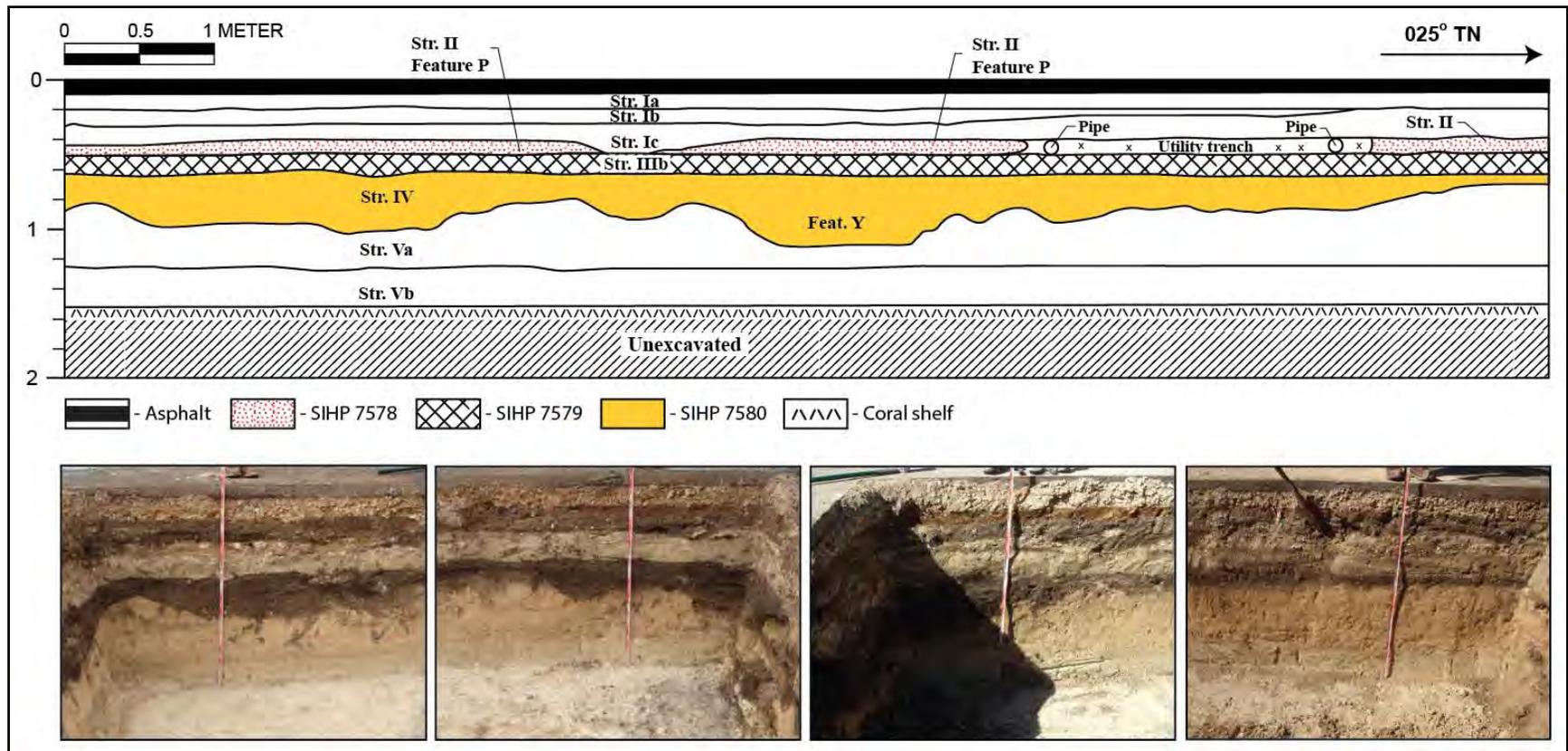


Figure 202. TE 40G, stratigraphic profile and photographs of west sidewall

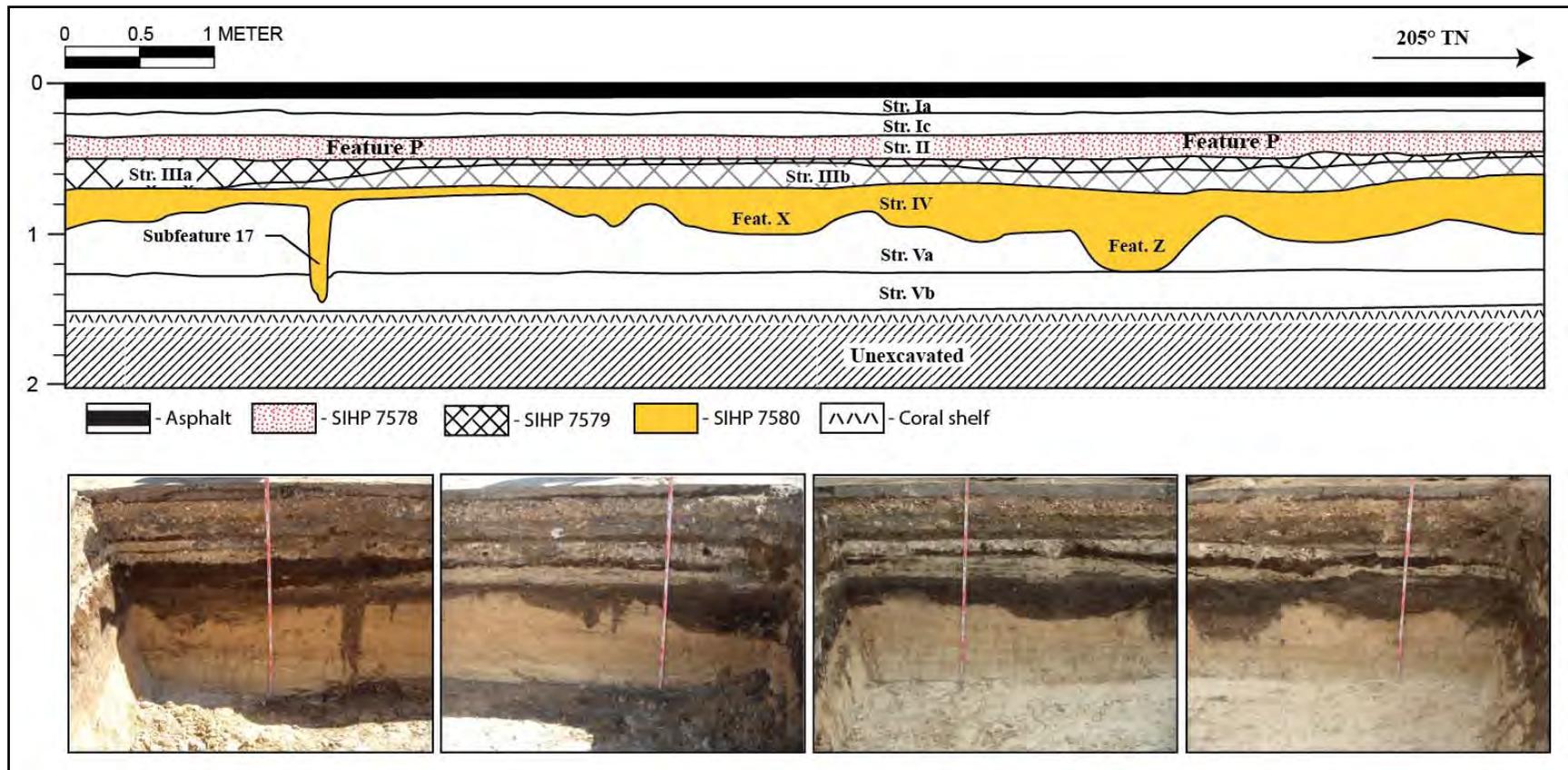


Figure 203. TE 40G, stratigraphic profile and photographs of east sidewall

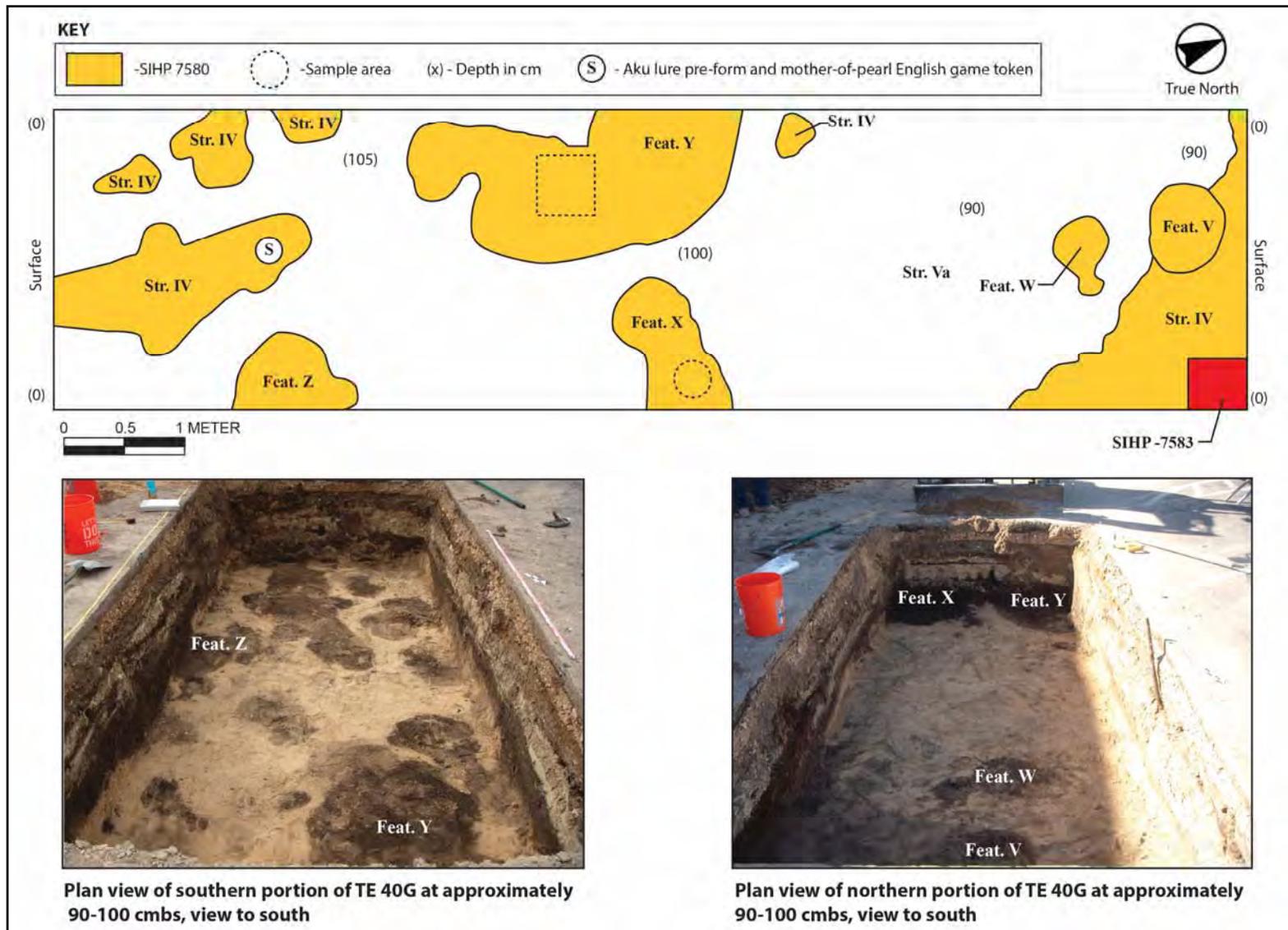


Figure 204. TE 40G plan view map and photographs

AIS for Kamehameha Schools Kaka'ako Block I, Honolulu, O'ahu

TMKs: [1] 2-1-056:002, 007 and 008

Six pit features (SIHP # -7580, Features V–Z and Subfeature 17) were identified as originating in Stratum IV (see Figure 202 through Figure 204, and Table 75). SIHP # -7580, Feature V consists of a circular pit observed in plan view of TE 40G (see Figure 204). The pit was intrusive into Stratum Va (Jaucas sand). The feature measured 60 cm in diameter and extended from 80 to 100 cm below the existing surface. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. Marine shell midden, fish bone, and charcoal were observed and collected. Based on its shape, size, and contents, SIHP # -7580, Feature V is identified as a fire pit utilized for food preparation.

SIHP # -7580, Feature W consists of an oblong pit observed in plan view of TE 40G (see Figure 204). The pit feature originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 50 cm by 40 cm in plan view and extended from 80 to 105 cm below the existing surface. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. Marine shell midden, fish bone, and charcoal were observed and collected. Based on its shape, size, and contents, SIHP # -7580, Feature W is identified as a fire pit utilized for food preparation.

SIHP # -7580, Feature X consists of an oblong pit observed in plan view and in the east profile of TE 40G (see Figure 203 and Figure 204). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 120 cm by 70 cm in plan view and extended from 80 to 100 cm below the existing surface. A 5-gallon sediment sample was collected and screened to identify cultural material and to gather additional data for determining its function. Sparse marine shell, fire-cracked rock (basalt), and charcoal were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature X is identified as a fire pit for food preparation.

SIHP # -7580, Feature Y consists of a large amorphous pit observed in plan view and in the west profile of TE 40G (see Figure 202 and Figure 204). The pit originated in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). The feature measured 270 cm by 120 cm in plan view and extended from 80 to 115 cm below the existing surface. A 8-gallon sediment sample was collected and screened to identify cultural material and to gather additional data for determining its function. Charcoal, metal, glass fragments, fire-cracked rock (basalt), and sparse marine shell were observed, but not collected. Based on its shape, size, SIHP # -7580, Feature Y is identified as a fire pit. for food preparation

SIHP # -7580, Feature Z consists of a circular pit observed in the plan view and in the east profile of TE 40G (see Figure 203 and Figure 204). The pit originated in Stratum IV (cultural layer) and was intrusive through Stratum Va (Jaucas sand) to the upper extent of Stratum Vb (marine clay). The feature measured 90 cm diameter and extended from 80 to 125 cm below the existing surface. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. Charcoal, fire-cracked rock (basalt), and sparse marine shell were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature Z is identified as a fire pit for food preparation.

SIHP # -7580, Subfeature 17 consists of a pit feature observed in the east profile of TE 40G (see Figure 203 and Figure 204). The pit feature originated in Stratum IV (cultural layer) and was intrusive through Stratum Va (Jaucas sand) and into Stratum Vb (marine clay). The feature measured 20 cm wide and 60 cm long in plan view and extended from 85 to 145 cm below the

Table 75. Pit Features Observed at TE 40G

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	V	60 cm diameter	80-100	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened.	Marine shell midden, fish bone, and charcoal; all cultural material collected	Fire pit/Food preparation
-7580	W	50 cm long by 40 cm wide	80-105	Mixture of Strata IV and Va sediments	Oblong pit feature observed in plan view of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened.	Marine shell midden, fish bone, and charcoal; all cultural material collected	Fire pit/Food preparation
-7580	X	120 cm long by 70 cm wide	80-100	Mixture of Strata IV and Va sediments	Oblong pit feature observed in plan view and east profile of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 10-gallon sample was collected and screened.	Sparse charcoal, marine shell, and fire-cracked rock (basalt) observed but not collected	Fire pit/Food preparation
-7580	Y	270 cm long by 120 cm wide	80-115	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and west profile of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 20-gallon sample was collected and screened.	Charcoal, metal, glass fragments, fire-cracked rock (basalt), and sparse marine shell observed but not collected	Fire pit/Food preparation
-7580	Z	90 cm diameter	80-125	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and east sidewall of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. Five gallons of sediment were collected and screened.	Sparse charcoal, shell midden, and fire-cracked rock (basalt) observed but not collected	Fire pit/Food preparation
-7580	Subfeature 17	20 cm wide by 60 cm long in profile	85-145	Mixture of Strata IV, Va, and Vb sediments	Narrow linear pit feature observed in east profile of TE 40G. Feature originates in Stratum IV and intrudes through Va and into Stratum Vb.	None observed	Postmold

existing surface. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. No cultural material was observed within the feature. Based on its shape, size, and contents, SIHP # -7580, Subfeature 17 is identified as a postmold.

## 4.2.2.52 Test Excavation 40H

<b>Length:</b>	4m
<b>Width:</b>	1.6 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 40H (TE 40H) (Table 76, Figure 205, and Figure 206) consists of modern fill (Stratum I), a crushed coral pavement (Stratum IIa), historic land reclamation fill (Stratum IIb), historic fill (Stratum III), a culturally-enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia, Ib, and Ic) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum IIa consists of a crushed coral pavement. Stratum IIb consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 40H indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 40H ceased at 1.5 m below the existing surface upon encountering limestone bedrock.

Of note is Stratum IIa, a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578. Stratum IIa overlies a historic land reclamation layer (Stratum IIb).

Also of interest is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Two concrete building foundations (SIHP # -7579, Features H and O) were identified in TE 40H. SIHP # -7579, Feature H was also identified in the adjacent TE 40C. In general, these foundations are square concrete bases (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set upright atop the square base. Each foundation column was installed by excavating a large builder's pit through Stratum III down to the coral shelf. Once the foundation column was placed in the pit, the pit was backfilled with the top of the rectangular columns likely extending slightly above Stratum III. Subsequent fill events have buried these columns.

SIHP # -7579, Feature H was originally observed in plan view within TE 40C (see Figure 166 and Figure 170) and was subsequently observed intruding into TE 40H (see Figure 207). It consists of an in-filled builder's pit containing a historic building foundation remnant. The pit measured 100 cm long by 60+ cm wide in plan view and extended from 40 to 150 cm below the existing surface. The feature is truncated by Stratum IIb and terminates in Stratum Vb. A square concrete block was observed at the base of the pit.

SIHP # -7579, Feature O was observed within the east sidewall of TE 40H and in plan view (see Figure 205, Figure 207, and Figure 208). It consists of an in-filled builder's pit containing a historic building foundation remnant. The pit measured 50 cm long by 30 cm wide in plan view extended in profile from 40 to 130 cm below the existing surface. The feature is truncated by

Table 76. Strata Observed at TE 40H

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-20	10YR 8/2, very pale brown; extremely gravelly medium sand; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; very abrupt lower boundary; smooth topography; imported fill material. This stratum consists of imported coral base course material associated with construction of the existing asphalt surface.
Ib	20-35	10YR 4/4, dark yellowish brown; silt loam; weak, fine, crumb structure; moist friable consistency; non-plastic; terrigenous origin; abrupt lower boundary; smooth topography; imported fill material. This is associated with construction of the existing asphalt surface.
Ic	25-40	10YR 3/2, very dark grayish brown; sandy loam; weak, fine, crumb structure; moist friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	35-45	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
IIb	40-55	10YR3/2, very dark grayish brown; sandy silt loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is identified as historic land reclamation fill.
III	50-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; crushed red brick observed within stratum (not collected). This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	70-115	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal, glass and ceramic fragments; buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. The top 10 cm of stratum was observed to have been truncated and compacted by historic grading. This layer has been designated as a component of SIHP # -7580.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Va	85-130	10YR 6/4, very pale brown; fine to medium sand; structureless, single-grain; moist, loose consistency; non-plastic; diffuse lower boundary; wavy topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	130-150	10YR 8/2, very pale brown; sandy clay; structureless, massive; wet, sticky consistency; slightly plastic; marine origin; lower boundary not visible; naturally deposited marine clay atop coral shelf (i.e., limestone bedrock), Zone 1.

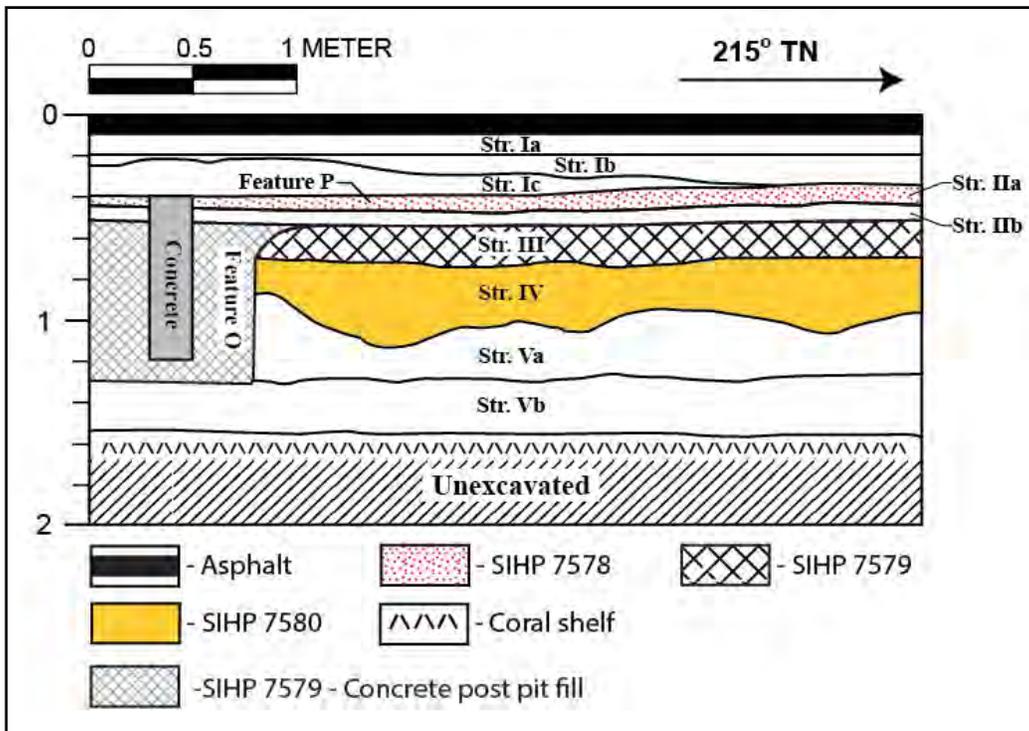


Figure 205. TE 40H, stratigraphic profile of east sidewall



Figure 206. TE 40H, photograph of east sidewall

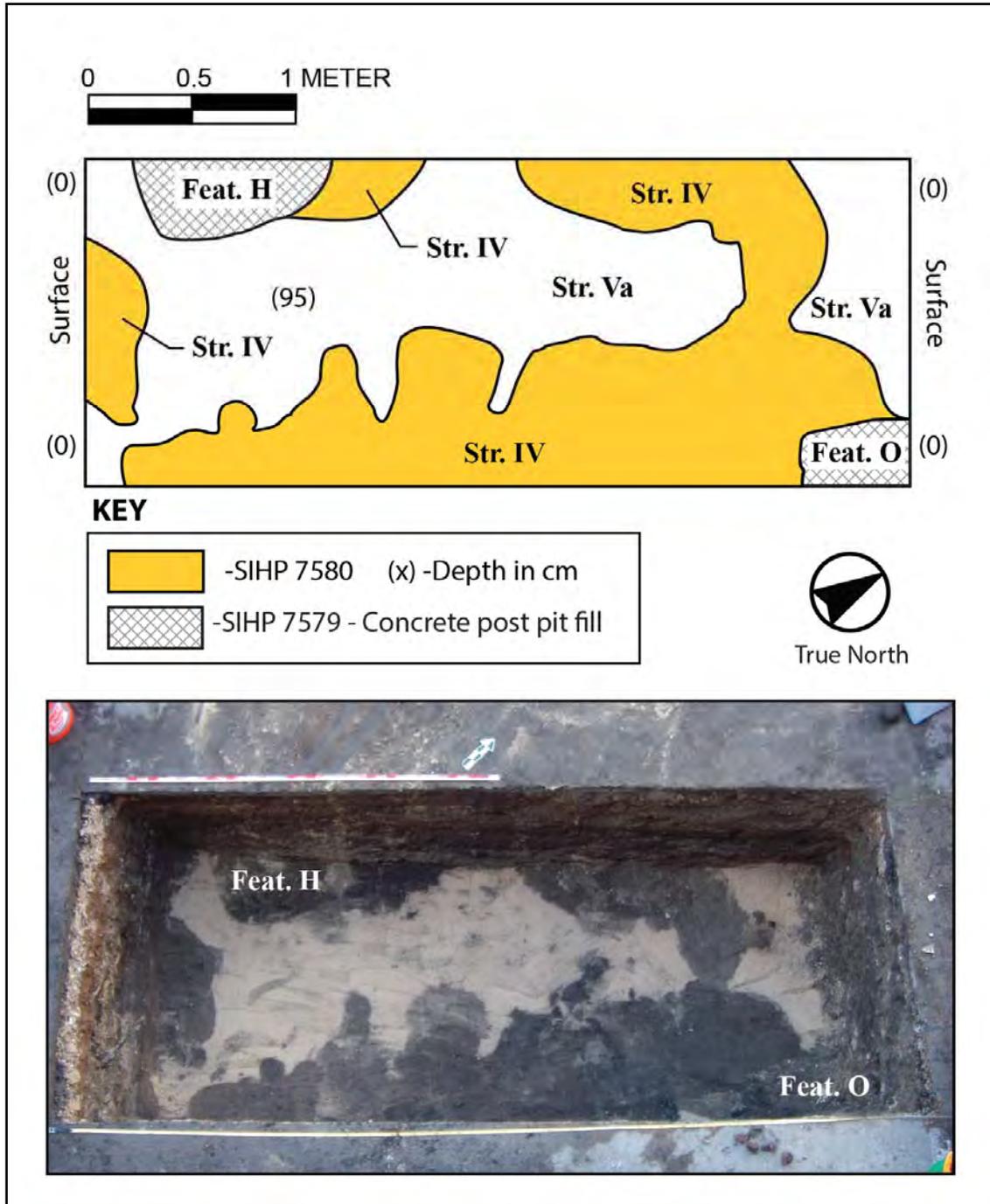


Figure 207. TE 40H plan view map and photograph at approximately 95 cmbs

Table 77. Pit Features Observed at TE 40H

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
-7579	H	100 cm long by 60+ cm wide	40-150	Mixture of Strata III, IV, Va and Vb sediments	Rectangular-shaped pit feature observed in TE 40C and in TE 40H plan view. Feature is truncated by Stratum IIb and terminates in Stratum Vb. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
-7579	O	50 cm long by 30 cm wide	40-130	Mixture of Strata IIa, IIb, III, IV, Va and Vb sediments	Square-shaped pit feature observed in TE 40H plan view and in east sidewall. The feature is truncated by Stratum IIb and terminates in the marine clay (Stratum Vb). Concrete block observed at base of pit.	Concrete column and base	Historic building foundation



Figure 208. Photograph of SIHP # -7579, Feature O (in-filled builder's pit containing a concrete foundation) within east sidewall of TE 40H

Stratum IIb and terminates in Stratum Vb. A square concrete block was observed at the base of the pit feature, with a rectangular concrete column freestanding atop the square block.

Stratum IV consists of a buried A horizon that developed atop the Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Sparse glass and ceramic fragments were also present. All observed cultural material was noted, but not collected. Stratum IV is identified as a cultural layer and has been designated as a component of SIHP # -7580.

## 4.2.2.53 Test Excavation 41

<b>Length:</b>	6m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 41 (TE 41) (Table 78, Figure 209, and Figure 210) consists of imported fill (Stratum I and Stratum II), historic fill (Stratum III), a culturally sterile A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia-Ib) consists of imported fill materials utilized for construction of the existing asphalt surface and underlying base course. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV is a culturally sterile, silty sand A horizon that developed atop Jaucas sand. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 41 indicates the presence of sand dune (Zone 1) (amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 41 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

A modern disturbance was observed in the southern end of TE 41 (see Figure 209). This disturbance is interpreted as a modern in-filled utility trench.

Of note is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Also of interest is a traditional Hawaiian basalt sinker (Acc. # 29) found at a depth of 85 cm below the existing surface (Figure 211) within the Jaucas sand (Stratum Va). It was not found within a cultural layer but was instead found within an otherwise culturally sterile deposit of marine sand. An analysis of this artifact is provided in Section 5 Results of Laboratory Analysis.

Table 78. Strata Observed at Test Excavation 41

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
N/A	10-160	Modern utility trench. The fill is a mixture of Strata Ia through Vb sediments.
Ia	10-30	10YR 7/2, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-50	5YR 4/4, reddish brown; clay; structureless massive; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported base course clay fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-60	10YR 8/3, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	60-70	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	70-90	10YR 4/2, dark grayish brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon; culturally sterile.
Va	80-120	10YR 8/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	120-160	10YR 7/2, very pale brown; clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, (Zone 1).

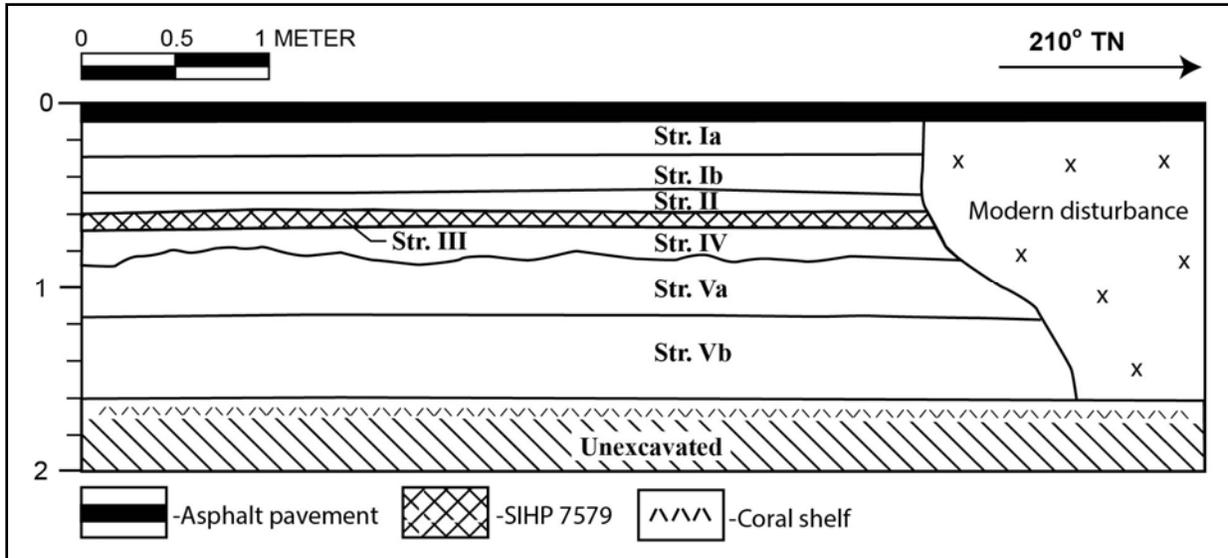


Figure 209. TE 41, stratigraphic profile of east sidewall



Figure 210. TE 41, photograph of east sidewall



Figure 211. Basalt sinker (Acc. # 29) present within TE 41 at 85 cmbs

## 4.2.2.54 Test Excavation 42

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	NE/SW

The stratigraphy of Test Excavation 42 (TE 42) (Table 79, Figure 212, and Figure 213) consists of imported fill (Stratum I and Stratum II), historic fill (Stratum III), a culturally sterile A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I consists of imported fill utilized for the construction of the existing asphalt surface. Stratum II consists of imported fill utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV is a culturally sterile, silty sand A horizon that developed atop the Jaucas sand. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 42 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 42 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

A modern disturbance was observed in the southwestern end of TE 42 (see Figure 212). This disturbance is identified as a modern in-filled utility trench.

Of note is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Table 79. Strata Observed at Test Excavation 42

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
N/A	10-160	Modern utility trench. The fill is a mixture of Strata I through Vb sediments.
I	10-160	5YR 4/4, reddish brown; loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported loam fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-80	10YR 8/3, very pale brown, cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral containing pockets of volcanic cinder. This stratum is associated with historic land reclamation.
III	55-95	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	90-110	10YR 4/2, dark grayish brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; truncated buried A horizon; no cultural material observed.
Va	110-130	10YR 8/4, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation; traditional Hawaiian basalt sinker observed and collected; Zone 1.
Vb	130-160	10YR 7/2, very pale brown; clay; structureless massive; moist, firm consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

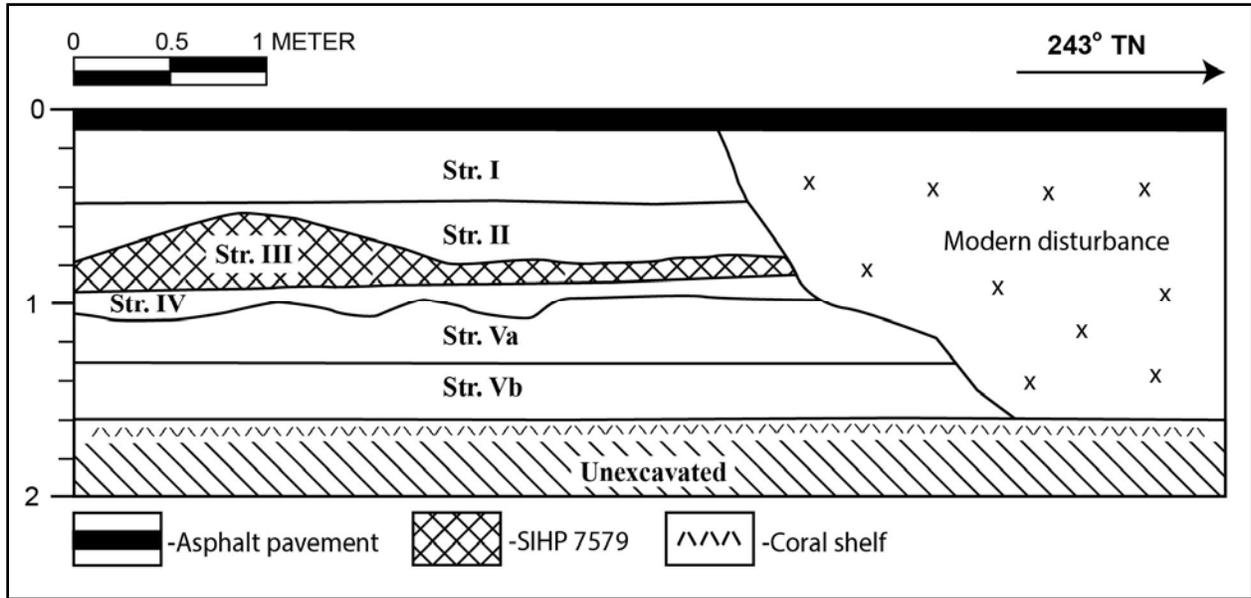


Figure 212. TE 42, stratigraphic profile of southeast sidewall



Figure 213. TE 42, photograph of southeast sidewall

## 4.2.2.55 Test Excavation 43

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 43 (TE 43) (Table 80, Figure 214, and Figure 215) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum III). Stratum I (Ia-Ib) consists of imported fill utilized for construction of the existing asphalt surface. Stratum II consists of a buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum III consists of Jaucas sand (IIIa) and marine clay (Stratum IIIb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 43 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 3) that defined the area prior to historic land reclamation. Excavation of TE 43 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

A disturbance was observed in the middle of TE 43. This disturbance is identified as a modern in-filled utility trench.

Also of note is Stratum II, a buried A horizon that developed atop Jaucas sand (Stratum IIIa) and that is enriched with cultural material. Marine shell midden, charcoal, and fire-cracked rock were dispersed evenly within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary remains being intact.

A 16-gallon sample (Sample Area 1) was collected from the upper to the lower extent of stratum II (80-90 cmbs) and screened for cultural content. Observed cultural material consisted of marine shell midden, charcoal, and fire-cracked rock. The cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis).

Stratum II is identified as a cultural layer based on the presence of cultural material and has been designated as a component of SIHP # -7580.

Table 80. Strata Observed at Test Excavation 43

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
N/A	0-10	Asphalt
Ia	10-60	7.5YR 4/4, brown; loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; clear lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	60-160	Modern utility trench. The fill is a mixture of Strata Ib through IIIb sediments.
Ib	60-160	10YR 4/3, brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; mixed imported fill. This stratum is associated with utility installation.
II	80-90	10YR 3/1, very dark gray; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; cultural material consisted of marine shell midden, basalt fire-cracked rock, and charcoal; buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. This layer has been designated as a component of SIHP # -7580.
IIIa	90-140	10YR 8/3, very pale brown; fine to medium sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IIIb	140-160	10YR 8/2, very pale brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

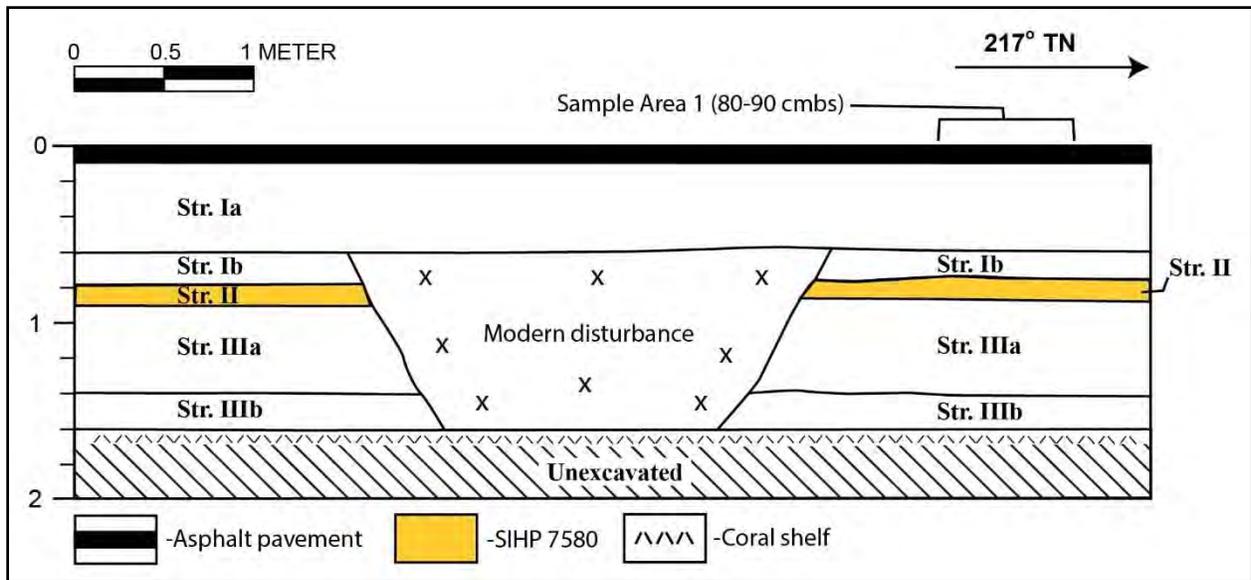


Figure 214. TE 43, stratigraphic profile of east sidewall



Figure 215. TE 43, photograph of east sidewall

## 4.2.2.56 Test Excavation 44

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 44 (TE 44) (Table 81, Figure 216, and Figure 217) consists of modern fill (Stratum I), land reclamation fill (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried silty sand A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Va) and marine clay (Stratum Vb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 44 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 44 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Also of note is Stratum IV, a buried A horizon that developed atop the Jaucas sand (Stratum Va) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact.

Marine shell midden, charcoal, and fire-cracked rock were dispersed within Stratum IV. The fire-cracked rock consisted of semi-porous, angular basalt. Historic glass and ceramic fragments were identified in the top 10 cm of the stratum (Figure 218), but not collected.

A 10-gallon sample (Sample Area 1) was collected from the upper to lower extent of Stratum IV (90-120 cmbs) from the west sidewall TE 44 (see Figure 216) and screened for cultural content. Observed cultural material consisted of marine shell midden, charcoal, and fire-cracked rock. The cultural material was collected for analysis (see Section 5 Results of Laboratory Analysis).

Stratum IV is identified as a cultural layer based on the presence of cultural material and has been designated as a component of SIHP # -7580.

Table 81. Strata Observed at Test Excavation 44

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
Ia	10-30	10YR 7/3, very pale brown; sandy clay; structureless massive; moist, firm consistency; slightly plastic; marine origin; very abrupt lower boundary; broken/discontinuous topography; locally procured fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	10-80	2.5Y 4/2, dark grayish brown; sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; irregular topography; mixed imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	60-80	10YR 8/2, very pale brown; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported crushed coral fill material. This stratum is associated with historic land reclamation.
III	80-90	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	90-120	10YR 3/1, very dark gray; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, basalt fire-cracked rock, historic glass and ceramic fragments (not collected); buried A horizon that developed atop Jaucas sand and that is enriched with cultural material and historic artifacts. This layer has been designated as a component of SIHP # -7580.
Va	100-140	2.5Y 8/2, pale yellow; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	140-160	2.5Y 8/2, pale yellow; sandy clay; structureless massive; moist, very firm consistency; plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

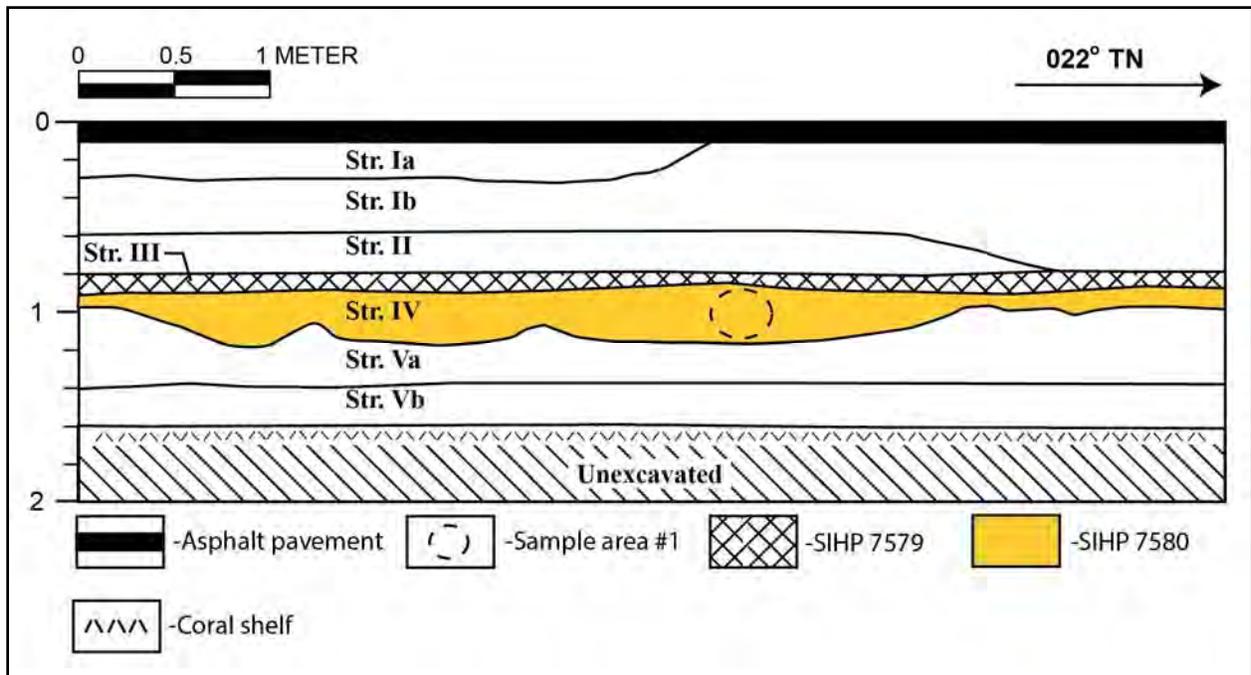


Figure 216. TE 44, stratigraphic profile of west sidewall



Figure 217. TE 44, photograph of west sidewall



Figure 218. Cultural material observed within the top 10 cm of Stratum IV (SIHP # -7580) in TE 44

## 4.2.2.57 Test Excavation 45

<b>Length:</b>	6m
<b>Width:</b>	0.8m
<b>Maximum Depth:</b>	1.6m
<b>Orientation:</b>	NW/SE

The stratigraphy of Test Excavation 45 (TE 45) (Table 82, Figure 219 and Figure 220) consisted of modern fill (Stratum I), land reclamation fill (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill material utilized for historic land reclamation. Stratum III consists of imported fill. Stratum IV consists of a buried silty sand A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Va) and marine clay (Stratum Vb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 45 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 45 ceased at 1.6 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

A disturbance was observed in the end of the northeastern sidewall of TE 43 (Figure 219). This disturbance is identified as a modern utility trench.

Of note is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Also of note is Stratum IV, a buried A horizon that developed atop the Jaucas sand (Stratum Va) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. This cultural layer has been designated as a component of SIHP # -7580.

An 8-gallon sample (Sample Area 1) was collected from the upper to lower extent of Stratum IV (80-120 cmbs) from the northeast sidewall TE 45 (see Figure 216) and screened for cultural content. The cultural material consisted of marine shell midden, charcoal, basalt flakes, and fire-cracked rock and was collected for analysis (see Section 5 Results of Laboratory Analysis).

A 15-gallon sample (Sample Area 2) was collected from Stratum IV from 80-100 cmbs and screened for cultural content. The cultural material which consisted of marine shell midden, charcoal, and fire-cracked rock was collected for analysis (see Section 5 Results of Laboratory Analysis).

Stratum IV is identified as a cultural layer based on the presence of cultural material and has been designated as a component of SIHP # -7580.

Table 82. Strata Observed at Test Excavation 45

Stratum	Depth (cmbs)	Description
N/A	0-10	Asphalt
I	10-70	7.5YR 4/4, brown; loam; moderate, fine, granular structure; moist, friable consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	20-130	Modern utility trench. The fill is a mixture of Strata II through Va sediments.
II	50-70	10YR 8/1, white; cobbly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; broken/discontinuous topography; imported crushed coral fill material. This stratum is associated with historic land reclamation (ca. twentieth century).
III	80-90	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	80-120	10YR 3/1, very dark gray; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, and basalt fire-cracked rock; buried A horizon that developed atop Jaucas sand and that is enriched with cultural material. This cultural layer has been designated as a component of SIHP # -7580.
Va	120-140	10YR 6/4, light yellowish brown; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography; Jaucas sand. This stratum consists of naturally deposited Jaucas sand and represents the presence of an sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
Vb	130-160	2.5Y 6/3, light yellowish brown; sandy clay; structureless massive; wet, slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

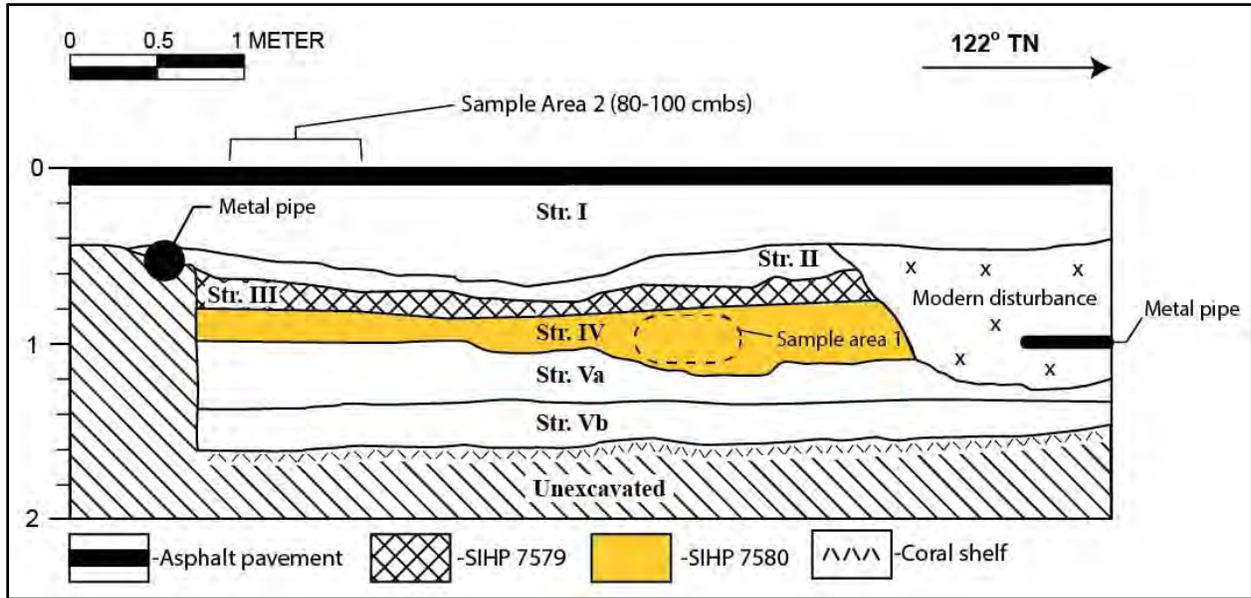


Figure 219. TE 45, stratigraphic profile of northeast sidewall



Figure 220. TE 45, photograph of northeast sidewall

## 4.2.2.58 Test Excavation 46

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 46 (TE 46) (Table 83, Figure 221, and Figure 222) consists of modern fill (Stratum I), historic fill (Stratum II), a culturally enriched A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I (Ia-Ib) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of imported fill. Stratum III consists of a buried silty sand A horizon that developed atop Jaucas sand and that is enriched with cultural material. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 46 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 46 ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Of note is Stratum II, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Also of note is Stratum III, a buried A horizon that developed atop Jaucas sand (Stratum IVa) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over), while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Glass and ceramic fragments were identified within the top 10 cm of the stratum. Stratum III is identified as a cultural layer and has been designated as a component of SIHP # -7580.

A single pit feature (SIHP # -7580, Subfeature 18) was observed within the east sidewall of TE 46 (see Figure 221, Figure 222, and Table 84). The feature originated at 80 cmbs and extended to 105 cmbs. The feature was circular with an approximately 20 cm diameter. Subfeature 23 was observed originating within Stratum III and as intruding into Stratum IVa. The entire feature was excavated and screened (approximately 3 gallons) to better determine its contents and function. No cultural material was observed. Subfeature 23 is identified as a postmold based on its circular shape, narrow diameter, vertical extent, and absence of cultural material.

Table 83. Strata Observed at Test Excavation 46

Stratum	Depth (cmbs)	Description
NA	0-10	Asphalt
Ia	10-30	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-50	10YR 4/4, dark yellowish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
II	50-65	17.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
III	65-90	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden, fire-cracked-rock (basalt), charcoal (not collected); buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. The top 10 cm of stratum contained glass and ceramic fragments (not collected). This cultural layer has been designated as a component of SIHP # -7580.
IVa	80-130	2.5Y 7/4, pale yellow; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation.
IVb	130-150	2.5Y 8/2, pale yellow; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock (Zone 1).

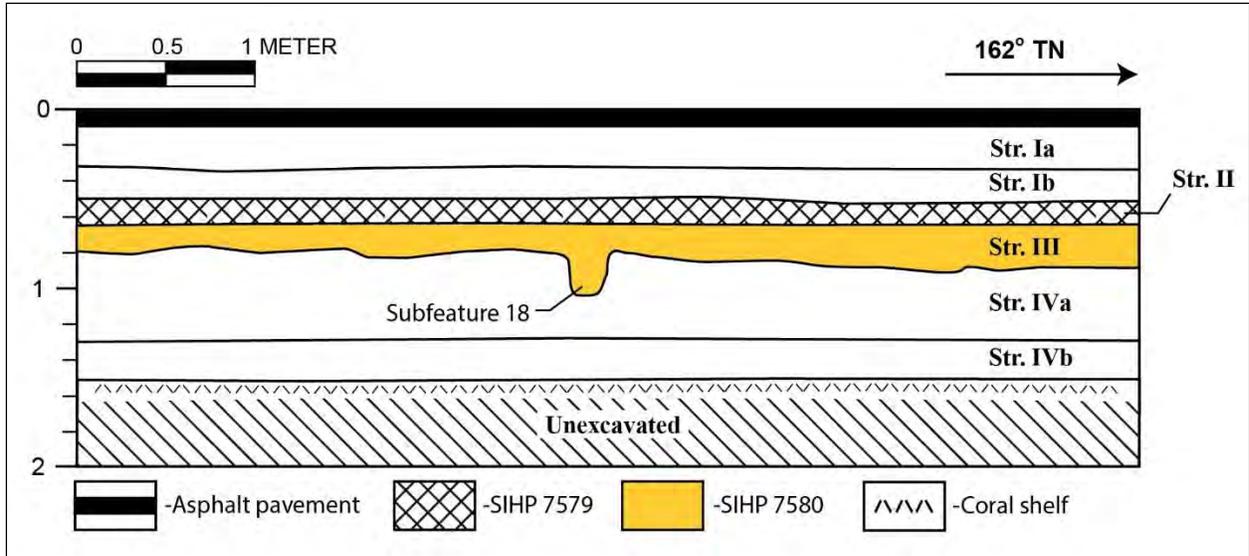


Figure 221. TE 46, stratigraphic profile of east sidewall



Figure 222. TE 46, photograph of east sidewall

Table 84. Pit Features Observed at TE 46

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	Subfeature 18	20 cm diameter	80-105	Mixture of Strata III and IVa sediments	Circular-shaped pit feature observed in east sidewall of TE 46. Feature originates in Stratum III and intrudes into Stratum IVa.	None observed	Postmold

## 4.2.2.59 Test Excavation 47

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	E/W

The stratigraphy of Test Excavation 47 (TE 47) (Table 85, Figure 223, and Figure 224) consists of modern fill (Stratum I), a crushed coral pavement (Stratum II), historic fill (Stratum III), a culturally enriched A horizon (Stratum IV), and naturally deposited sediments (Stratum V). Stratum I (Ia, Ib, and Ic) consists of imported fill material utilized for construction of the existing asphalt surface. Stratum II consists of a crushed coral pavement. Stratum III consists of imported fill. Stratum IV consists of a buried A horizon that developed atop the Jaucas sand and that is enriched with cultural material. Stratum V consists of Jaucas sand (Stratum Va) and marine clay (Stratum Vb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 47 indicates the presence of a sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. Excavation of TE 47 ceased at 1.6 m below the existing surface upon encountering limestone bedrock.

A disturbance was observed near the middle of TE 47. This disturbance is interpreted as a modern in-filled utility trench.

Of note is Stratum II, a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.

Also of note is Stratum III, a localized fill event. This fill layer has been designated as a component of SIHP # -7579.

Stratum IV consists of a buried A horizon that developed atop the Jaucas sand (Stratum Va) and that is enriched with cultural material. The upper boundary of this stratum has been truncated by historic development (i.e., graded and filled over) while the lower boundary remains intact. Marine shell midden, charcoal, and fire-cracked rock (basalt) were dispersed within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Stratum IV is considered a cultural layer and has been designated as a component of SIHP # -7580.

A pit feature was observed as originating in Stratum IV (Table 86) and as intruding into Stratum Va (Jaucas sand). SIHP # -7580, Feature AA consists of a circular pit observed in plan view and in the north profile of TE 47 (see Figure 223, Figure 224). The feature measured 85 cm diameter and extended from 85 to 115 cm below the existing surface. The feature was completely excavated to identify cultural material and to gather additional data for determining its function. Charcoal, fire-cracked rock (basalt), and sparse marine shell were observed, but not collected. Based on its shape, size, and contents, SIHP # -7580, Feature AA is identified as a fire pit for food preparation.

Table 85. Strata Observed at TE 47

Stratum	Depth (cmbs)	Description
NA	0-10	Asphalt
Ia	10-30	10YR 6/3, pale brown; gravelly loamy sand; weak, fine, crumb structure; moist, friable consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-40	10YR 3/4, dark yellowish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
Ic	35-50	10YR 5/2, grayish brown; gravelly sandy loam; weak, fine, crumb structure; moist, friable consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	50-105	Modern utility trench. The fill is a mixture of Strata II through Va sediments.
II	50-65	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
III	65-80	7.5YR 3/3, dark brown; clay loam; moderate, fine, blocky structure; moist, firm consistency; slightly plastic; mixed origin; abrupt lower boundary; smooth topography; imported clay loam fill material; no cultural material observed. This stratum is identified as a localized fill deposit and is designated as a component of SIHP # -7579.
IV	80-115	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; diffuse lower boundary; wavy topography; contained marine shell midden and charcoal (not collected); buried A horizon that developed atop the Jaucas sand. This layer has been designated as a component of SIHP # -7580.
Va	90-125	2.5Y 7/4, pale yellow; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of a sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.

<b>Stratum</b>	<b>Depth (cmbs)</b>	<b>Description</b>
Vb	125-160	2.5Y 8/2, pale yellow; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

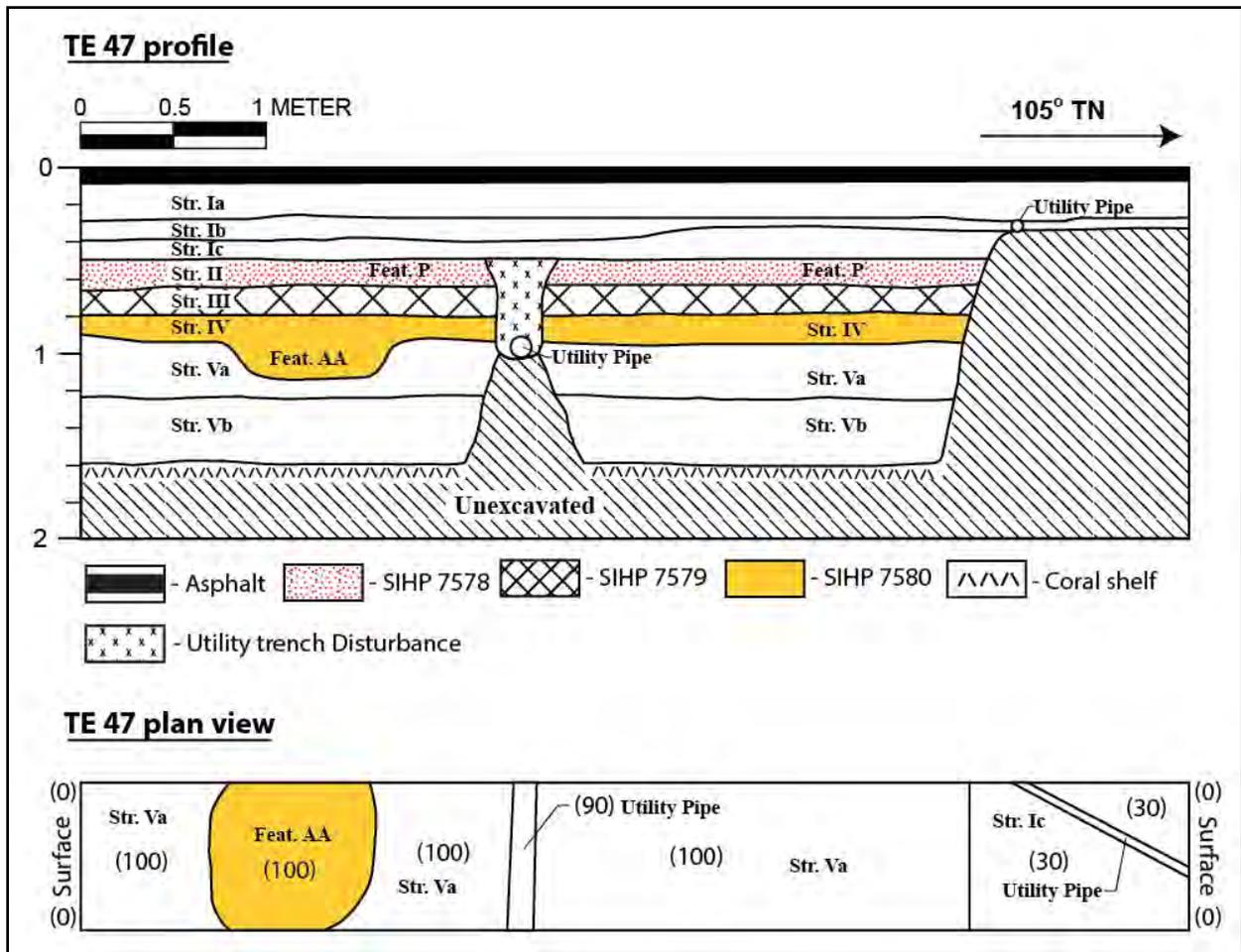


Figure 223. TE 47, stratigraphic profile of north sidewall (top) and plan view (bottom)



Figure 224. TE 47, photograph of north sidewall, including Feature AA

Table 86. Pit Features Observed at TE 47

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7580	AA	85 cm diameter	85-115	Strata IV and Va sediments	Circular pit feature observed in plan view and in north sidewall of TE 47. Feature originates from Stratum IV and intrudes into Stratum Va. Ten gallons of sediment were collected and screened.	Moderate charcoal, fire-cracked rock (basalt), and sparse marine shell observed, but not collected	Fire pit/Food preparation

## 4.2.2.60 Test Excavation 48

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.5 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 48 (TE 48) (Table 87, Figure 225, and Figure 226) consists of modern fill (Stratum I) and naturally deposited sediments (Stratum II). Stratum I consists of imported fill material utilized for construction of the existing asphalt surface (Ia and Ib) and for the installation of subsurface utilities (Ic). Stratum II consists of Jaucas sand (Stratum IIa) and marine clay (Stratum IIb) developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed in TE 48 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation. A utility pipe diagonally traverses the northern half of TE 48. The stratigraphy in TE 48 indicates that an initial attempt to install the pipe was unsuccessful due to the presence of a concrete box (SIHP # -7578, Feature M). The in-filled trench from this initial attempt is visible in the eastern sidewall (see Figure 225). The southern side of the concrete box has evidence of bulldozer scarring. Excavation of TE 48 ceased at 1.5 m below the existing surface upon encountering the coral shelf (i.e., limestone bedrock).

Two subsurface pit features associated with SIHP # -7578 were observed within TE 48 (Table 88). SIHP # -7578, Feature L consists of a large bowl-shaped pit observed in plan view and in the east profile of TE 48 (see Figure 225 and Figure 226). The upper extent of the feature was truncated by Stratum Ib while its lower extent intrudes into Stratum IIb. Additionally, a modern utility trench has disturbed the northernmost end of the feature. Feature M measured 280 cm long by 80 cm wide in plan view and extended from 40 to 120 cm below the existing surface. Observed cultural material consisted of glass bottles, slate, red brick, marble fragments, and metal fragments (see Section 5 Laboratory Analysis). Based on its cultural content, SIHP # -7578 Feature L is interpreted to be a historic trash pit.

SIHP # -7578 Feature M consists of a square concrete box observed in plan view and in the east profile of TE 48 (see Figure 225, Figure 226, and Figure 227). Within the excavated portion of TE 48, the pit associated with installation of this box was removed during the prior installation of a utility pipe (see Figure 225). Feature M likely originated in SIHP # -7578 deposits which have been completely truncated and removed by Stratum Ib and the utility trench. The concrete box is enclosed at the base, but open at the top. The east and west sides of box contain angled outlet holes for water or sewage flow. The box was filled with small ceramic, glass, and faunal bone (bird) fragments all within a matrix of charred sand. The cultural material was noted, but not collected. Based on its construction and stratigraphic provenience, SIHP # -7578 Feature M is identified as a septic tank containing historic material.

Table 87. Strata Observed at TE 48

Stratum	Depth (cmbs)	Description
NA	0-10	Asphalt
Ia	10-30	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	30-50	10YR 4/4, dark yellowish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
N/A	40-80	Utility trench consisting of imported marine clay dredge material. Evidence of the initial attempt to install the utility pipe is visible in the eastern sidewall. The pipe appears to have been repositioned in the western portion of the test excavation to avoid the concrete box (SIHP # -7578, Feature M).
IIa	90-120	2.5Y 7/4, pale yellow; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of an elevated sand dune amidst the tidal flats that defined the area prior to historic land reclamation; Zone 1.
IIb	120-150	2.5Y 8/2, pale yellow; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

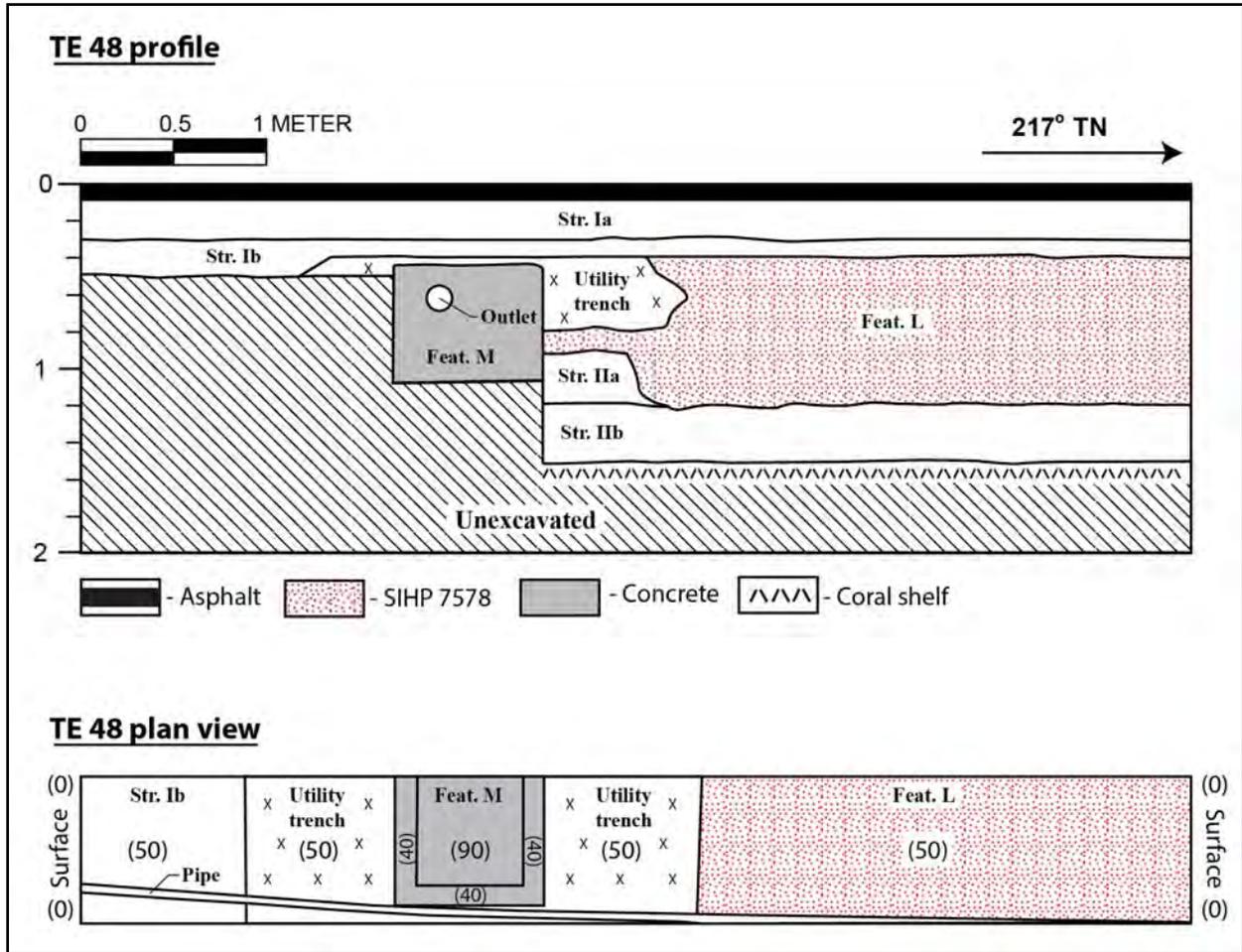


Figure 225. TE 48, stratigraphic profile of east sidewall (top) and plan view (bottom)



Figure 226. TE 48, photograph of east sidewall

Table 88. Pit Features Observed at TE 48

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
-7578	L	280 cm long by 80 cm wide	40-120	Mixture of Strata IIa and IIb sediments	Large bowl-shaped pit feature observed in plan view and east sidewall of TE 48. Truncated by Stratum Ib and intrudes into Stratum IIb	Glass bottles, slate, red brick, marble, and metal fragments	Trash pit
-7578	M	70 cm long by 70 cm wide	40-110	Pit fill removed by subsequent utility installation	Square concrete box in TE 48 that is enclosed at base, but open at top. The east and west side the of box contain angled outlet holes assumed to transport liquid (i.e., water or sewage).	Concrete box filled with small ceramic, glass, and faunal bone (bird) fragments all within a matrix of charred sand	Water control



Figure 227. SIHP # -7578 Feature M, view to east

## 4.2.2.61 Test Excavation 49

<b>Length:</b>	6 m
<b>Width:</b>	0.8 m
<b>Maximum Depth:</b>	1.6 m
<b>Orientation:</b>	N/S

The stratigraphy of Test Excavation 49 (TE 49) (Table 89, Figure 228, and Figure 229) consists of modern fill (Stratum I), a culturally enriched A horizon (Stratum IIa), a crushed coral pavement (Stratum IIb), utility fill (Stratum IIc), a culturally sterile A horizon (Stratum III), and naturally deposited sediments (Stratum IV). Stratum I consists of imported fill associated with development of the existing asphalt surface. Stratum IIa consists of a culturally enriched buried A horizon that developed atop a crushed coral pavement. Stratum IIb consists of a crushed coral pavement. Stratum IIc consists of dredged marine fill associated with the installation of a historic utility. Stratum III consists of a culturally sterile A horizon that developed following historic grading of coastal sand dunes. Stratum IV consists of Jaucas sand (Stratum IVa) and marine clay (Stratum IVb) that developed atop the coral shelf (i.e., limestone bedrock). The Jaucas sand observed at TE 49 indicates the presence of sand dune (Zone 1) amidst the tidal flats (Zone 2) that defined the area prior to historic land reclamation.

Of note is Stratum IIa, a buried A horizon that developed atop a historic crushed coral pavement (Stratum IIb) and that is enriched with historic artifacts. The upper portion of Stratum IIa has been truncated by Stratum Ib. The extant portion of Stratum IIa intrudes into Stratum IIb. Sparse glass and metal fragments were dispersed within the stratum. Charcoal flecking was also observed. Stratum IIa is considered a cultural layer based on the presence of historic artifacts and subsurface pit features (see below) and has been designated as a component of SIHP # -7578. The pavement (Stratum IIb) is designated as Feature P and as a component of SIHP # -7578.

Two pits (SIHP # -7578, Features N and O) originating from Stratum IIa were observed (see Figure 228 and Table 90). SIHP # -7578 Feature N consists of a circular pit feature observed in plan view and in the west profile of TE 49 (see Figure 225 and Figure 230). It measured 80 cm in diameter and extended from 35 to 95 cm below the existing surface. The entire feature was excavated to identify cultural content and to determine its function. Observed cultural material consisted of glass bottles and metal fragments (see Section 5 Laboratory Analysis). SIHP # -7578 Feature N is identified as a historic pit of unknown function.

SIHP # -7578 Feature O consists of an oblong pit feature observed in the west profile of TE 49 (see Figure 225 and Figure 231). It measured 30 cm long by 30 cm wide in profile, and extended from 35 to 65 cm below the existing surface. The entire feature was excavated in an attempt to identify cultural content and to determine its function. Observed cultural material consisted of plastic and metal fragments (not collected). Based on its stratigraphic provenience and cultural content, SIHP # -7578 Feature O is identified as a historic pit of unknown function.

Table 89. Strata Observed at TE 49

Stratum	Depth (cmbs)	Description
NA	0-10	Asphalt
Ia	10-20	10YR 7/4, very pale brown; extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt lower boundary; smooth topography; imported coral base course fill material. This stratum is associated with construction of the existing asphalt surface.
Ib	20-35	10YR 4/4, dark yellowish brown; sandy loam; weak, fine, crumb structure; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; imported fill material. This stratum is associated with construction of the existing asphalt surface.
IIa	35-90	10YR 2/2, very dark grayish brown; sandy loam; weak, fine, crumb; moist, very friable consistency; non-plastic; mixed origin; abrupt lower boundary; wavy topography; cultural material consisted of charcoal flecking, historic bottle glass, and metal fragments (not collected). This stratum is identified as a cultural layer and is designated as a component of SIHP # -7578.
IIb	35-50	10YR 8/2, very pale brown, extremely gravelly medium sand; structureless, single-grain; moist, loose consistency; non-plastic; marine origin; abrupt, lower boundary; smooth topography; imported crushed coral fill material that has been compacted and leveled. This stratum consists of a crushed coral pavement that is designated as Feature P and as a component of SIHP # -7578.
IIc	40-75	10YR 7/2, light gray; clay; structureless, massive; moist, firm consistency; plastic; mixed origin; slightly plastic; very abrupt lower boundary; wavy topography; imported marine clay dredge material associated with the installation of a utility line.
III	70-80	10YR 2/2, very dark brown; silty sand; structureless single-grain; moist, loose consistency; non-plastic; mixed origin; abrupt lower boundary; smooth topography; no cultural material observed; buried A horizon that developed atop the Jaucas sand.
IVa	80-125	2.5Y 7/4, pale yellow; fine sand; structureless single-grain; moist, loose consistency; non-plastic; marine origin; diffuse lower boundary; smooth topography. This stratum consists of naturally deposited Jaucas sand and represents the presence of sand dune amidst the tidal flats that defined the area prior to historic land reclamation, Zone 1.
IVb	125-160	2.5Y 8/2, pale yellow; sandy clay; structureless massive; wet slightly sticky consistency; slightly plastic; marine origin. This stratum consists of naturally deposited marine clay atop limestone bedrock, Zone 1.

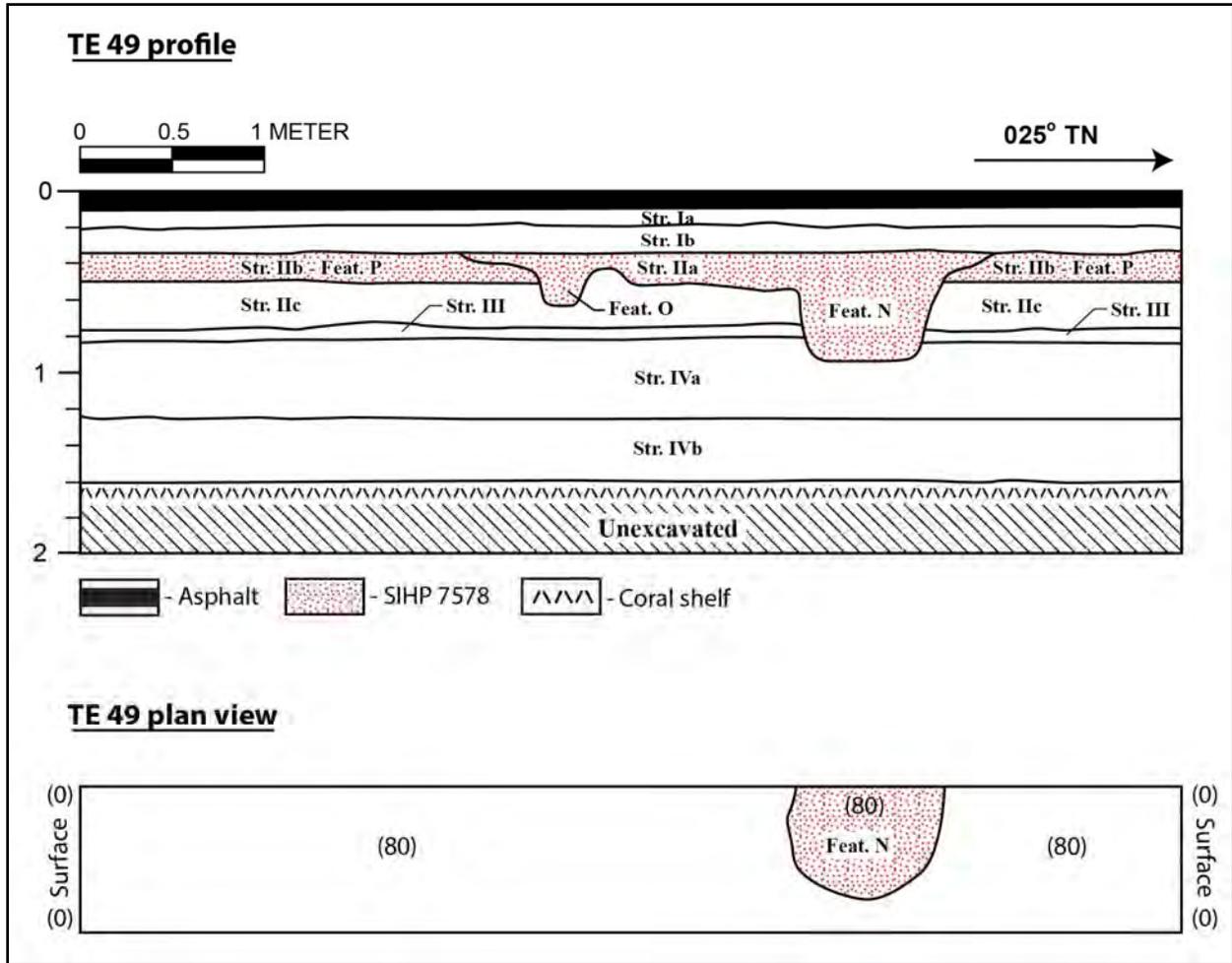


Figure 228. TE 49, stratigraphic profile of west sidewall (top) and plan view (bottom)



Figure 229. TE 49, photograph of west sidewall

Table 90. Pit Features Observed at TE 49

SIHP #	Feature #	Horizontal Extent	Vertical Extent (cmb)	Pit Fill	Description	Cultural Material	Function
-7578	N	80 cm diameter	35-95	Mixture of Strata IIa, IIb, III, and IV sediments	Circular pit feature observed in plan view and west sidewall of TE 49. Feature originated in Stratum IIa and intrudes into Stratum IVa.	Glass bottles and metal fragments	Unknown
-7578	O	30 cm long by 30 cm wide in profile	35-65	Mixture of Strata IIb and IIc sediments	Oblong pit feature observed in west sidewall of TE 49. Feature originated in Stratum IIa and intrudes into Stratum IIc.	Metal and plastic fragments	Unknown



Figure 230. SIHP # -7578 Feature N within TE 49 west sidewall



Figure 231. SIHP # -7578 Feature O within TE 49 west sidewall

## 4.3 Historic Property Descriptions

### 4.3.1 SIHP # 50-80-14-7578

<b>TEMPORARY #</b>	CSH 1
<b>FORMAL TYPE:</b>	Subsurface cultural layer and associated coral pavement and pit features (horse burial, postmolds, trash pits, and fire pits)
<b>FUNCTION:</b>	Habitation and commercial
<b># OF FEATURES:</b>	16
<b>AGE:</b>	Post-Contact (Early to mid-twentieth century)
<b>DIMENSIONS:</b>	Indeterminate

**DESCRIPTION:** SIHP # -7578 is a subsurface historic cultural layer observed discontinuously across the project area within test excavations 8, 9, 12, 18-20, 25, 25A-25D, 28, 40B-40H, 47, 48, and 49 (Figure 232). The interpolated boundaries of SIHP # -7578, shown on Figure 232 through Figure 235, are defined by the trenches wherein the SIHP # -7578 cultural layer and/or its associated features were present.

SIHP # -7578 is generally evidenced by an A horizon that developed atop large scale historic land reclamation fill (i.e., crushed coral) but was also present atop the more localized fill layer designated as a component of SIHP # -7579 (ca. 1900). The SIHP # -7578 cultural layer was documented from 30 to 80 cm below the existing ground surface and consisted of a dark grayish brown sandy loam that contained charcoal flecking, as well as glass, metal, and ceramic fragments. Historic fire insurance maps spanning from 1927 to 1956 indicate dense clusters of dwellings throughout the project area, a horse corral, as well as areas utilized for various light industrial activity (Figure 233 through Figure 235). According to a U.S. war department map, these residences appear to have been constructed sometime between 1919 and 1927 (see Figure 26 and Figure 233). SIHP # -7578 appears to correlate with this period of land use within the project area.

Sixteen features were identified as being associated with the SIHP # -7578 cultural layer (Table 91). These include a crushed coral pavement, a buried septic tank, and various pit features (trash pits, postmolds, a horse burial, and a fire pit).

SIHP # -7578 Feature P consists of a crushed coral pavement that was observed within test excavations 25, 25A-25D, 40B-40H, and 49. In general, the pavement was observed overlying either historic land reclamation fill layers (TEs 25, 25A-25C, 40b, 40C, 40E, and 40H) or the SIHP # -7579 fill layer (TEs 40D, 40F, and 40G). In one test excavation (TE 49), Feature P was overlying a historic utility fill deposit. Feature P postdates the SIHP # -7579 fill layer, which is dated to ca. 1900 based on historic maps (see Section 4.3.2 SIHP # -7579 description). The pavement appears to be related to a series of dwellings that appear on historic fire insurance maps between 1927 and 1956 (see Figure 31, Figure 32, and Figure 33). The exact function of

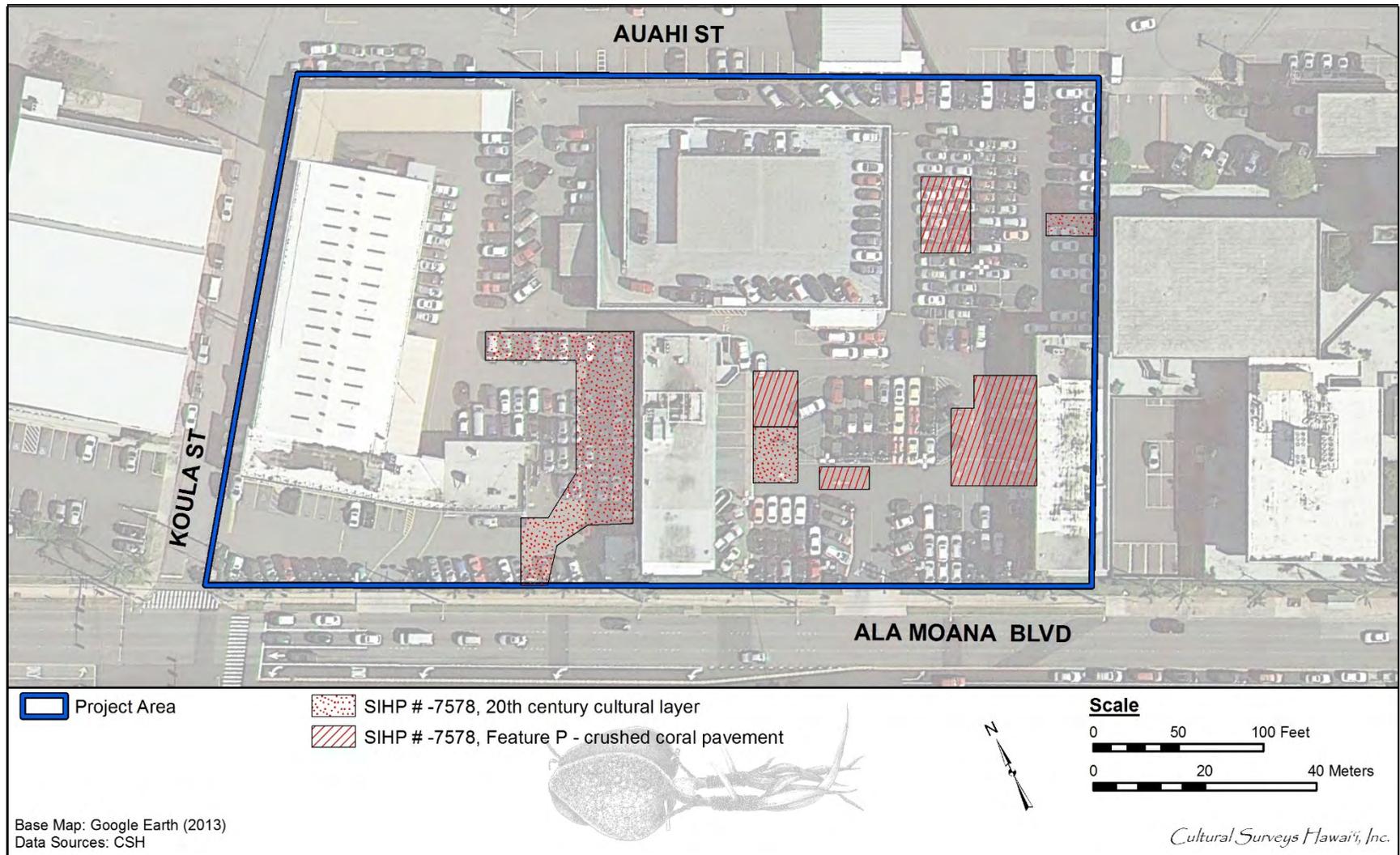


Figure 232. Aerial photograph showing the location of SIHP # -7578 cultural layer and SIHP # -7578, Feature P coral pavement within the project area

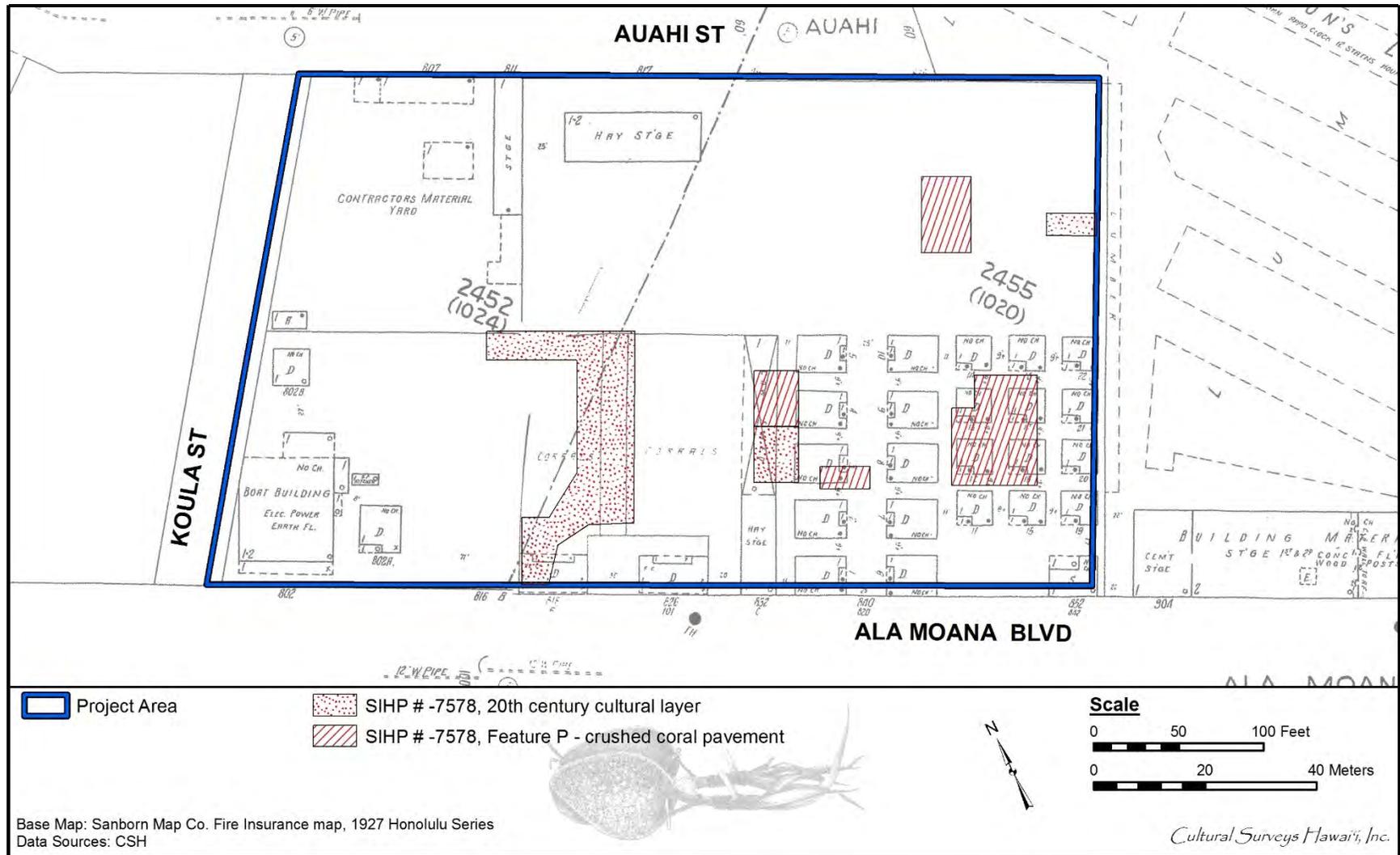


Figure 233. 1927 Sanborn Fire Insurance Map showing SIHP # -7578 cultural layer and SIHP # -7578, Feature P coral pavement within the project area

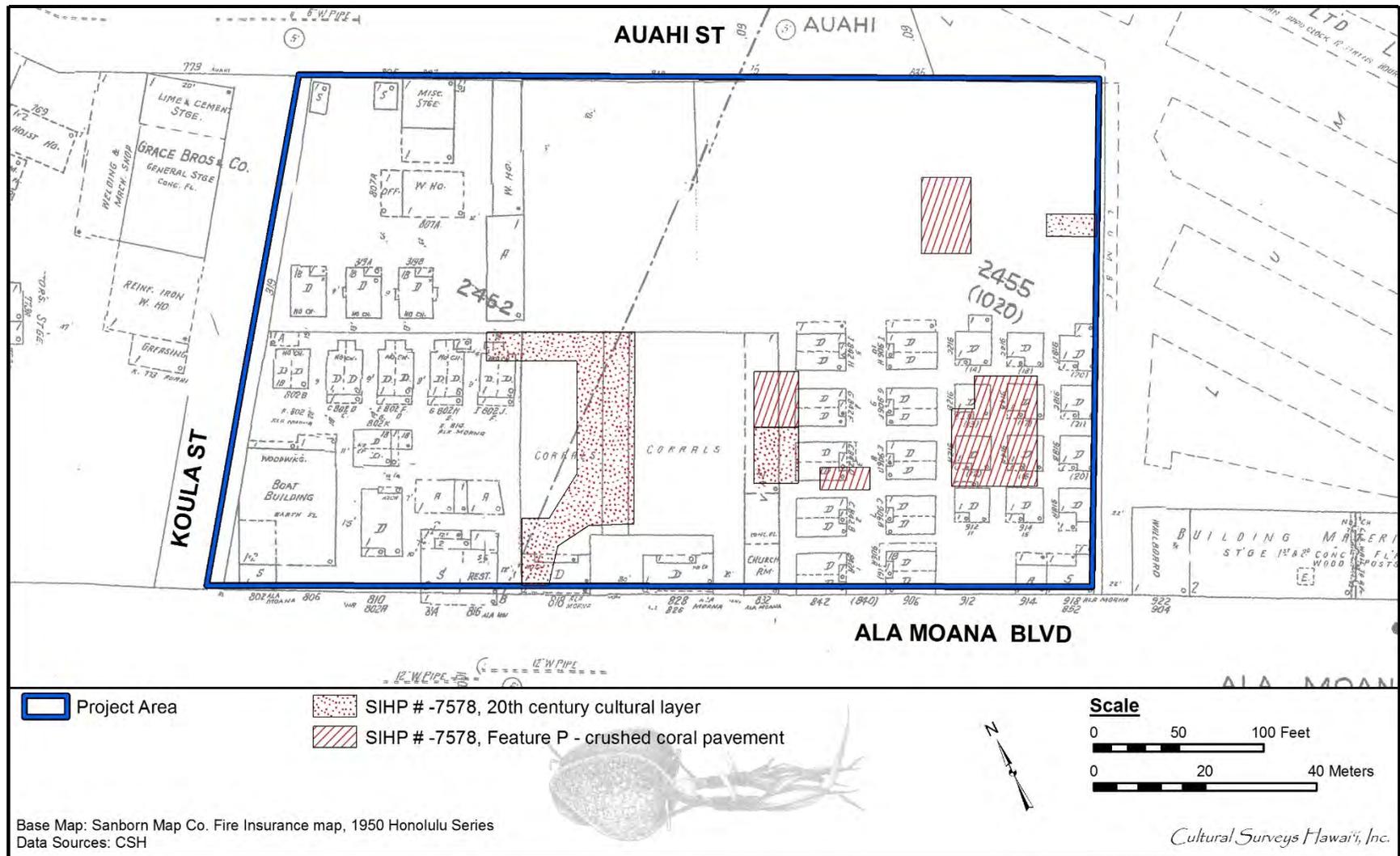


Figure 234. 1950 Sanborn Fire Insurance Map showing SIHP # -7578 cultural layer and SIHP # -7578, Feature P coral pavement within the project area

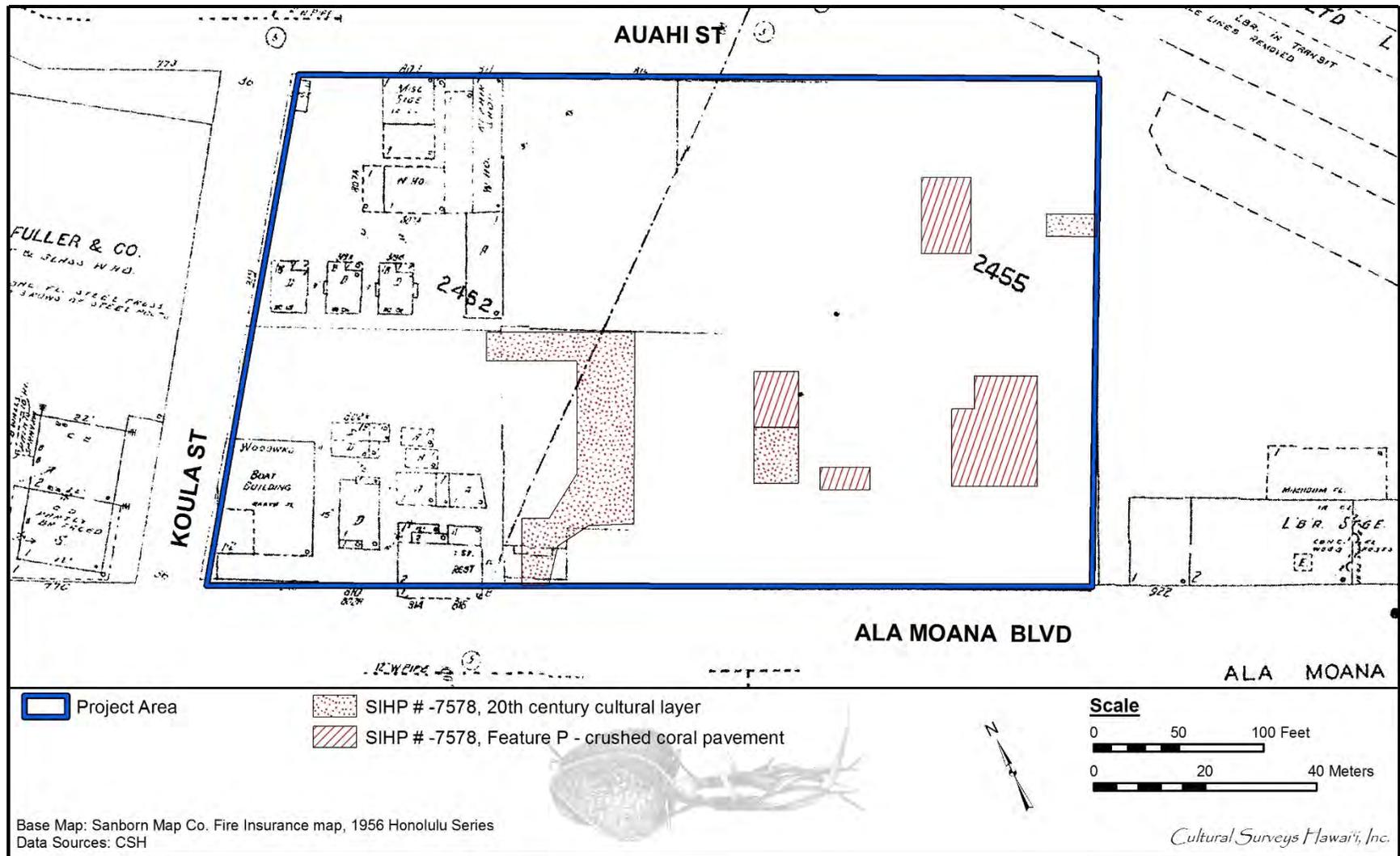


Figure 235. 1956 Sanborn Fire Insurance Map showing SIHP # -7578 cultural layer and SIHP # -7578, Feature P coral pavement within the project area

Table 91. SIHP # -7578 Feature Table

Feature	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
A	130 cm long x 40 cm wide	60-160	Mixture of Strata IIIa-IIIc, IV, Va, and Vb	Rectangular-shaped pit feature observed within northeast sidewall of TE 8. Feature originates from Stratum II and intrudes into Stratum Vb.	A single wooden plank at base of feature; small red brick, glass, and ceramic fragments observed within pit fill (not collected); historic materials widely dispersed, not concentrated	Unknown
B	100 cm long	50-80	Mixture of Strata IIIa and IIIb	Rectangular-shaped pit feature observed within the southwest sidewall of TE 12. The feature originates in Stratum II and intrudes into Stratum IIIb.	Clear screw-top bottle, an amber Clorox bottle base, metal wire-cut nails, a saw-cut cow bone, a metal spoon fragment, and miscellaneous bottle glass fragments	Unknown
C	140 cm long	60-110	Mixture of Strata IIIa, IIIb, and IV	Trapezoid-shaped pit feature observed in north wall of TE 19. Feature originates from Stratum II and intrudes into Stratum IV.	Broken glass bottles, metal and ceramic fragments	Unknown
D	70 cm long	60-130	Mixture of Strata IIIa, IIIb, IV, and Va	Square-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Va.	None observed	Unknown
E	30 cm diameter	60-120	Mixture of Strata IIIa, IIIb, IV, and Va	Rectangular-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Va.	Rectangular 2 x 4 wooden post remnant set vertically observed within feature	Postmold
F	110 cm long	60-150	Mixture of Strata IIIa, IIIc, IV, Va, and Vb	Funnel-shaped pit feature observed in east sidewall of TE 20. Pit feature originates from Stratum II and intrudes into Stratum Vb.	Two plastic toy cars, two glass bottles, and one plastic 1948 Chevron gas station calendar	Unknown

Feature	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
G	190 cm long by 80+ cm wide	40-140	Mixture of Strata II and III	Bowl-shaped pit feature observed within the northwest sidewall of TE 25. The upper portion of the feature is truncated by Stratum I. Pit feature cuts through Stratum II and intrudes into Stratum III.	Complete, fully articulated horse burial, an isolated human tooth, and a human cranial fragment	Horse burial and secondary isolated human remains
H	400 cm long by 80+ cm wide	25-75	Mixture of Strata II and IIIa	Large bowl-shaped pit feature observed in the southwest sidewall of TE 28. Feature originates in Stratum II and intrudes into Stratum IIIa.	Pig bones, charcoal, burnt basalt cobbles, and a glass bottle	Fire pit/Food preparation
I	120 cm long	30-70	Mixture of Strata II and III	Bowl-shaped pit feature within southwest sidewall of TE 25A. The upper boundary of the feature has been truncated by Stratum I. The feature intrudes through Stratum II and into Stratum III.	Charcoal, glass, metal, red brick, saw-cut faunal bone	Unknown
J	100 cm long	30-60	Mixture of Strata II and III	Circular-shaped pit feature observed in the northeast sidewall of TE 25C and in plan view. The upper boundary of the feature has been truncated by Stratum I. The feature intrudes through Stratum II and into Stratum III.	A glass bottle, glass fragments, fork, metal fragments, slag, saw-cut faunal bone and charcoal	Unknown
K	90 cm long by 50 cm wide	35-105	Mixture of Strata IIa, IIb, III, IV, and Va	Oblong pit feature observed in plan view of TE 40E. The feature intrudes through Strata IIa, IIb, III, IV, and Va. The upper portion of the feature was truncated by Stratum Ib.	Glass milk bottles, bone button, slate pencil, glass vial, and a copper handle	Trash pit
L	280 cm long by 80 cm wide	40-120	Mixture of Strata IIa and IIb	Large bowl-shaped pit feature observed in plan view and east sidewall of TE 48. Truncated by Stratum Ib and intrudes into Stratum IIb	Glass bottles, slate, red brick, marble, and metal fragments	Trash pit

Feature	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
M	70 cm long by 70 cm wide	40-110	Pit fill removed by subsequent utility installation	Square concrete box in TE 48 that is enclosed at base, but open at top. East and west side of box contain angled outlet holes assumed to transport liquid (i.e., water or sewage).	Concrete box filled with small ceramic, glass, and faunal bone (bird) fragments all within a matrix of charred sand	Water control
N	80 cm diameter	35-95	Mixture of Strata IIa, IIb, III, and IV	Circular pit feature observed in plan view and west sidewall of TE 49. Feature originated in Stratum IIa and intrudes in to Stratum IVa.	Glass bottles and metal fragments	Unknown
O	30 cm long by 30 cm wide in profile	35-65	Mixture of Strata IIb and IIc	Oblong pit feature observed in and west sidewall of TE 49. Feature originated in Stratum IIa and intrudes into Stratum IIc.	Metal and plastic fragments	Unknown
P	Varies	Varies	NA	Crushed coral pavement in TEs 25, 25A-25D, 40B-40H, and 49.	None observed	Land surface

the pavement is unknown, but it appears to have provided a stable land surface for development in the area.

SIHP # -7578 Feature M consists of a buried square concrete box believed to be utilized for wastewater management (see Table 91 and Figure 236). The concrete box is enclosed at the base, but open at the top. The east and west side of the box contains angled outlet holes for water or sewage outflow. The box was filled with small ceramic, glass, and faunal bone (bird) fragments all within a matrix of charred sand (cultural material noted, but not collected). Based on its construction and stratigraphic provenience SIHP # -7578, Feature M is identified as a historic septic tank.

Two of the sixteen identified features (12.5%) consisted of trash pits (SIHP # -7578, Features K and L) (see Table 91). They vary in size and shape and the upper portions of both of them have been truncated by base course or fill deposits associated with the construction of the modern asphalt surface. Feature K intrudes through the coral pavement (SIHP # -7578 Feature P) and into the natural sediments (Stratum Va) (see Figure 192 and Figure 194). Feature L similarly intrudes through several fill layers and into the natural sediments. Both of the trash pits contained similar types of refuse. The cultural material observed in these pits include glass bottles (Clorox, milk, and soda), saw-cut faunal bone, metal nails, metal utensils, plastic toy cars, a slate pencil, a glass vial, and a plastic calendar (dated 1948). This assemblage of cultural material is indicative of the early to mid-twentieth century habitation within the project area. Additionally, bottles collected for analysis from these trash pits have been dated between the 1910s to the 1940s (see Section 5 Laboratory Analysis below).

SIHP # -7578, Feature G consists of a fully articulated horse burial (see Table 91). The burial pit was observed cutting through SIHP # -7578 (cultural layer) and intruding into the underlying fill deposits (i.e., imported historic land reclamation fill) (Figure 237). The burial pit had a horizontal extent of 190 cm long by 80+ cm wide, and was present from 40 to 140 cm below the existing surface. During documentation of the horse burial a single isolated human molar was identified. This prompted the complete excavation of the horse burial to determine if additional human remains were present. Further exploration identified a possible cranial fragment in addition to the molar. The human remains (SIHP # -7582) were isolated to the pit fill of SIHP # -7578, Feature G. It was determined the human remains were associated with the imported historic land reclamation fill, and the human remains were within a secondary burial context, being disturbed during removal and transport of fill sediment. Following documentation of this feature, the human skeletal remains were wrapped in muslin and placed in a small *lauhala* basket. The basket was then filled with clean sand and returned to the approximate location where the human molar was first identified. The excavation was then backfilled, with a small plywood board placed atop the *lauhala* basket for added protection and to act as a marker if the need arises to relocate the remains.

SIHP # -7578, Feature H consists of a fire pit utilized for food preparation (see Table 91). The feature was observed cutting through SIHP # -7578 (cultural layer) and intruding into the underlying fill deposits (i.e., imported historic land reclamation fill) (Figure 238). It had a horizontal extent of approximately 400 cm long and 80+ cm wide, and was present from 25 to 75 cm below the existing surface. Cultural materials observed included pig bones, charcoal, a glass milk bottle, and six charred water-rounded basalt cobbles. Given the lack of fire-altered

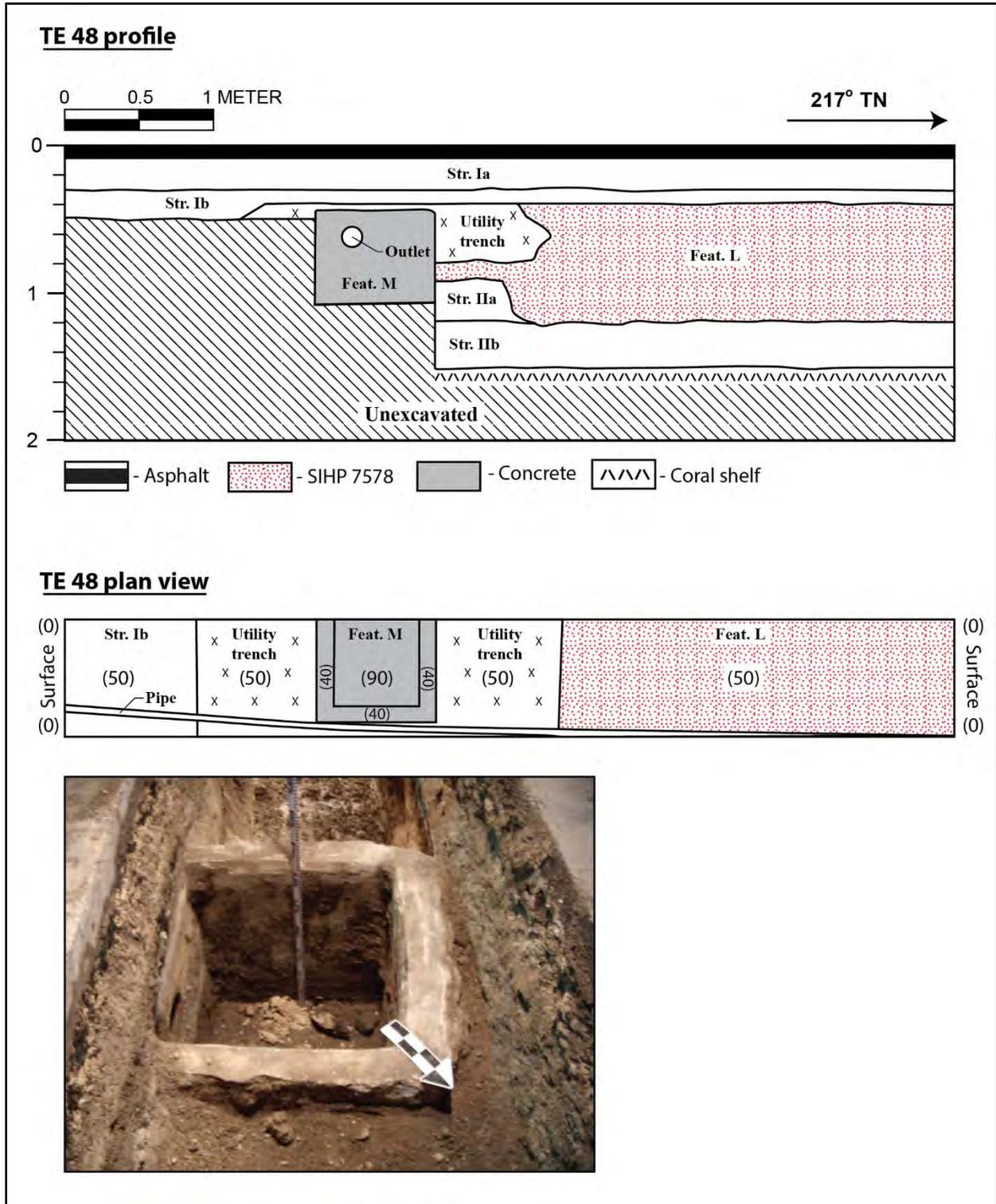


Figure 236. SIHP -7578 Feature M, plan view, profile and photograph

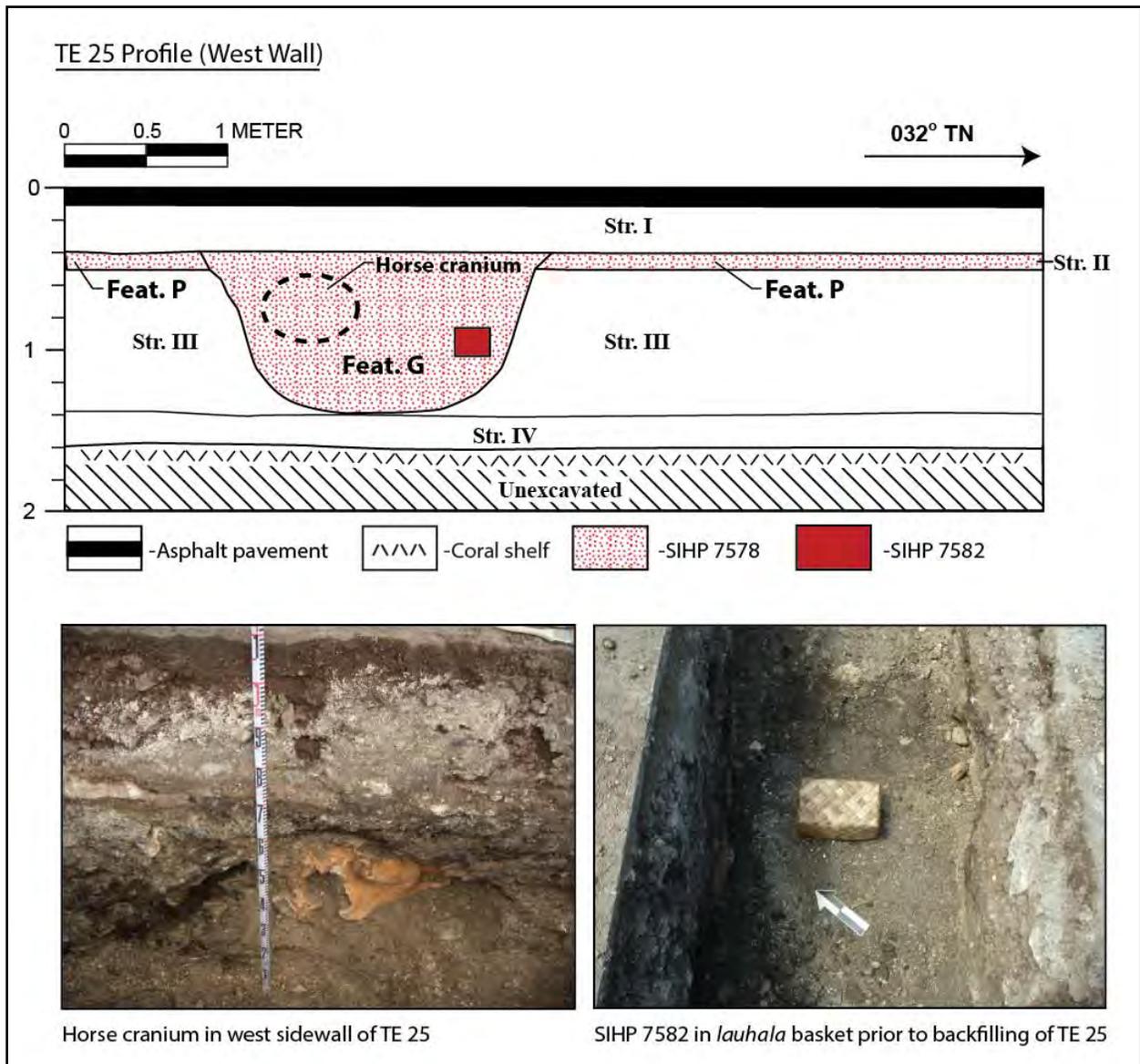


Figure 237. SIHP # -7578, Feature G (Horse burial) and Burial Find SIHP # -7582

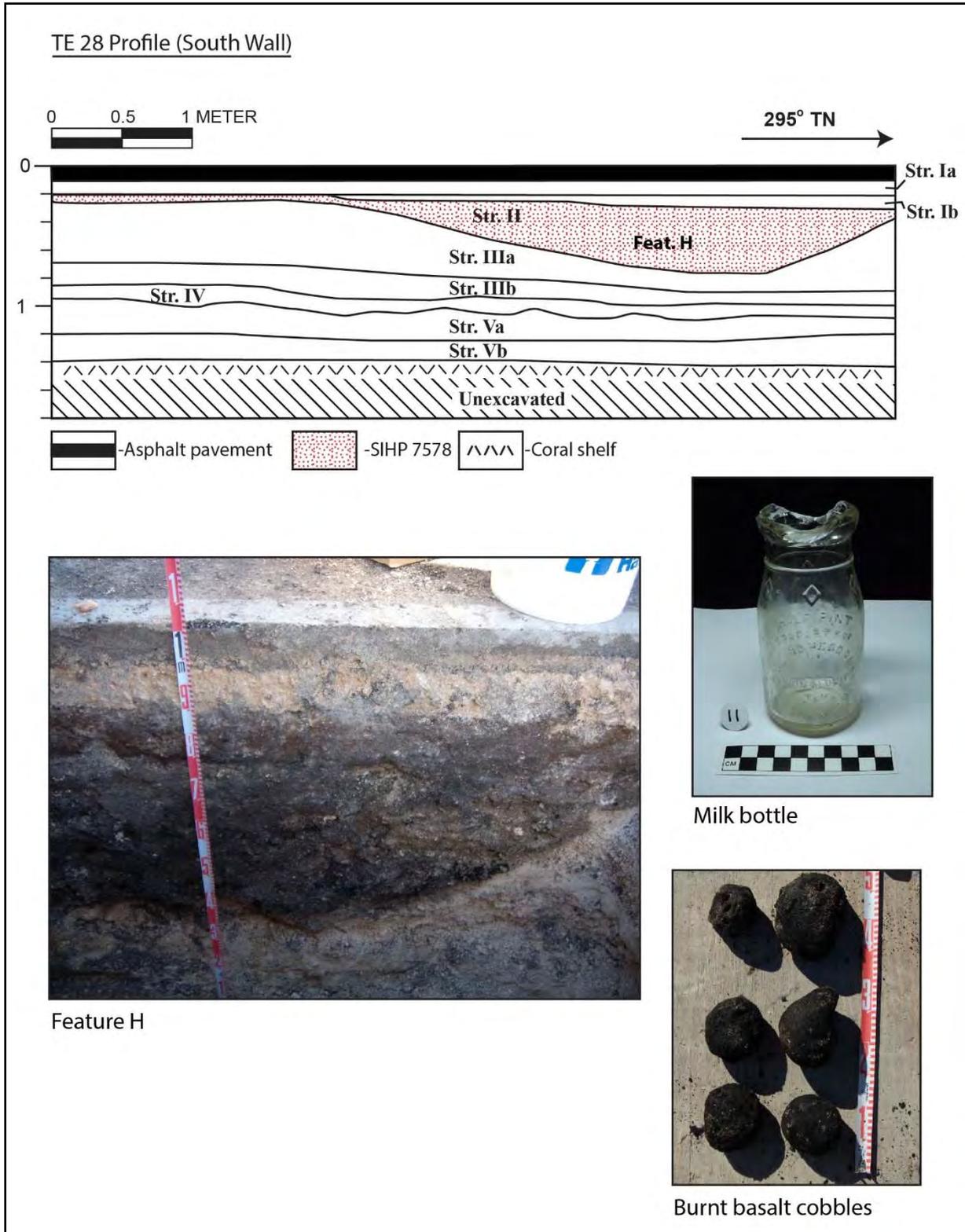


Figure 238. SIHP # -7578 Feature H (cooking feature)

rocks and charcoal, this pit appears to reflect a fire pit rather than a traditional *imu*, or earth oven.

The ten remaining features associated with SIHP # -7578 consist of a postmold and nine features of unknown function (SIHP # -7578, Features E, A-D, F, I, J, and N-O; see Table 91). The postmold (SIHP # -7578, Feature E) was observed in TE 20 and consisted of a rectangular pit originating in the SIHP # -7578 cultural layer and intruding into the underlying land reclamation fill. A rectangular “2 x 4” wooden post remnant, set vertically, was observed within the feature. In the immediate vicinity of this postmold was SIHP # -7578, Feature D, a square pit originating in the SIHP # -7578 cultural layer and ranging from 60 to 130 cm in depth below the existing surface. No cultural material was observed within the pit. The exact function of this feature could not be determined.

The remaining eight pit features (SIHP # -7578, Features A-C, F, I, J, and N-O) varied in size and shape. Features A-C, F, and N-O originated from the base of the SIHP # -7578 cultural layer, while Features I and J were truncated by Stratum I and intrude through the SIHP # -7578 cultural layer (see Table 91). All of the pits contained similar types of cultural material. The cultural material observed included broken glass bottles, metal, ceramic fragments, red brick, two plastic toy cars, and a 1948 Chevron gas station calendar (see Section 5 Laboratory Analysis below). The cultural material was not observed in a quantity indicative of a trash pit. The function of these features is unknown.

Based on the available historic maps, the stratigraphy, and the artifact assemblage collected from SIHP # -7578 Features F, H, K, L, and N, the SIHP # -7578 cultural layer are determined to be related to either, or both, the Union Feed Company or the residences that were erected within the project area sometime between 1919 and 1927. These residential structures were present up until at least 1956. The collected artifacts are dated to 1905 to 1950.

**4.3.2 SIHP # 50-80-14-7579**

<b>TEMPORARY #</b>	CSH 2
<b>FORMAL TYPE:</b>	Cultural fill layer and associated structural building remains
<b>FUNCTION:</b>	Commercial
<b># OF FEATURES:</b>	15
<b>AGE:</b>	Post-Contact (ca. 1900)
<b>DIMENSIONS:</b>	Indeterminate

**DESCRIPTION:** SIHP # -7579 consists of an early twentieth century fill layer and 15 associated building foundations. SIHP # -7579 and its component features were observed within the southern corner of the project area, within test excavations 40, 40A-40H, 41, 42, and 44-47 (Figure 239). The interpolated boundaries of SIHP # -7579, shown on Figure 239 and Figure 242 through Figure 244, are defined by the trenches wherein the SIHP # -7579 cultural fill layer and/or building foundations were present.

The SIHP # -7579 fill layer is comprised of a dark brown clay loam that was deposited over a naturally occurring sand dune. Artifacts collected from this layer date to the nineteenth century and include ceramic tableware fragments, kaolin clay pipe fragments, and a celluloid hair barrette (see Section 5 Laboratory Analysis). These artifacts are believed to have been imported with the SIHP -7579 fill layer, and not related to land use associated within the area.

Fifteen concrete building foundations (SIHP # -7578 Features A-O) were identified within test excavations 40A-40E and 40H (Table 92). All of the foundations intrude through the SIHP # -7579 fill layer and, thereby, postdate it. In general, these foundations consist of a square concrete base (70 cm long by 70 cm wide by 20 cm high) set on the coral shelf, with a rectangular concrete column (90 cm long by 30 cm wide by 30 cm high) set freestanding and upright atop the square base (Figure 240). The builder's pits for these foundations originated from the former ground surface and extended down to the coral shelf. The concrete foundations were installed within the builder's pits, which were then backfilled. The top of the rectangular columns would likely have extended slightly above the ground surface prior to subsequent fill events.

The Union Feed Company operated within the current project area at the beginning of the twentieth century. A ca. 1900 photograph of Kaka'ako shows the Union Feed Company in relation to the U.S. Immigration Station (Figure 241). A review of a 1914 fire insurance map and a 1919 war map indicates that the distribution of the building foundations (SIHP # -7579, Features A-O) corresponds to the limits of the Union Feed Company stables (Figure 242, Figure 243, and Figure 244). The map also depicts wagon sheds and stables within the project area during the early twentieth century, prior to the establishment of a series of houses shown on a 1927 map (see Figure 233). Based on historic maps and its geographic distribution, the SIHP # -7529 fill layer appears to represent a localized fill event associated with the construction of the Union Feed Company (ca. 1900). This fill layer may have been intended to create a stable

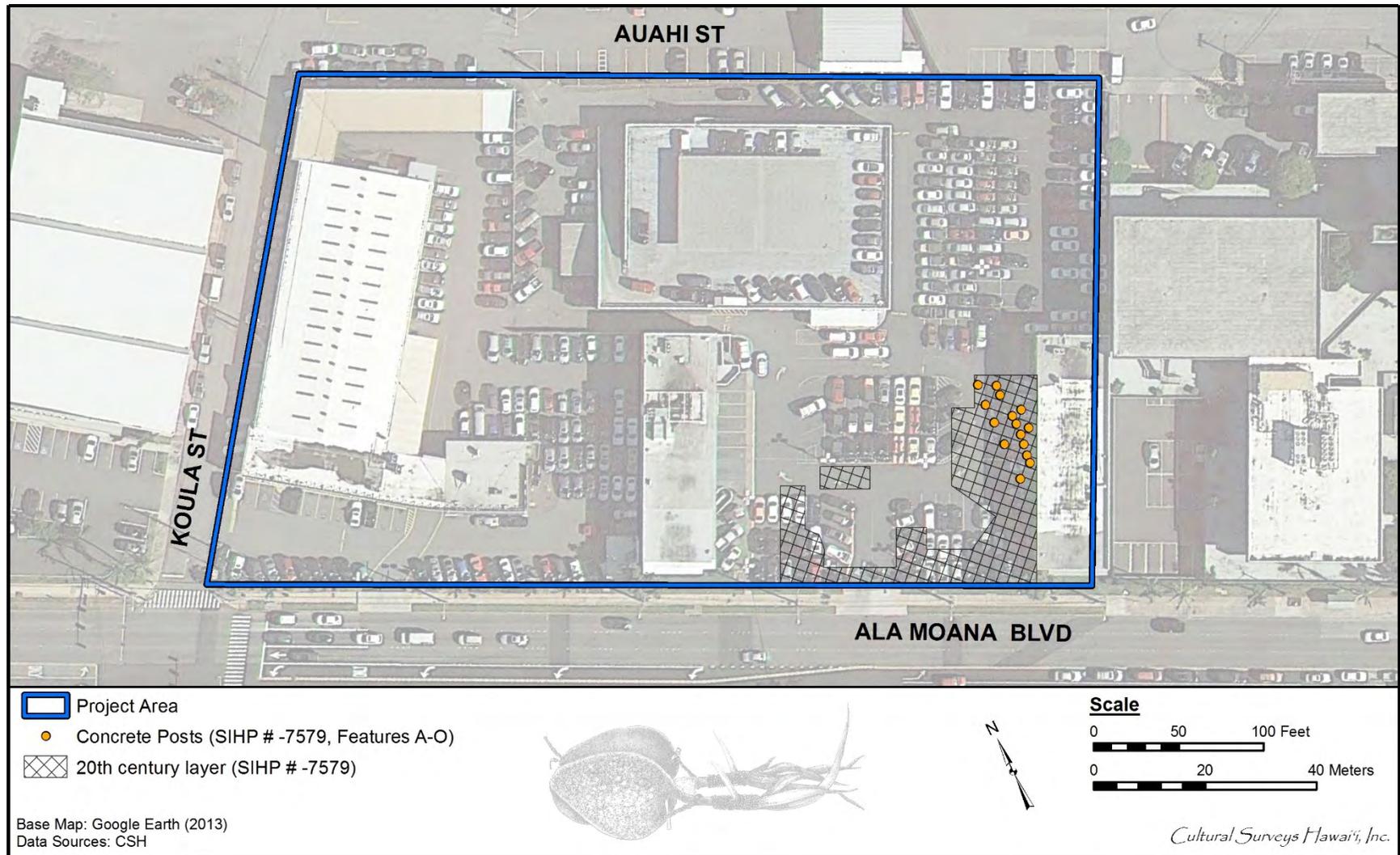


Figure 239. Aerial photograph showing the location of SIHP # -7579 cultural layer and SIHP # -7579, Features A-O within the project area

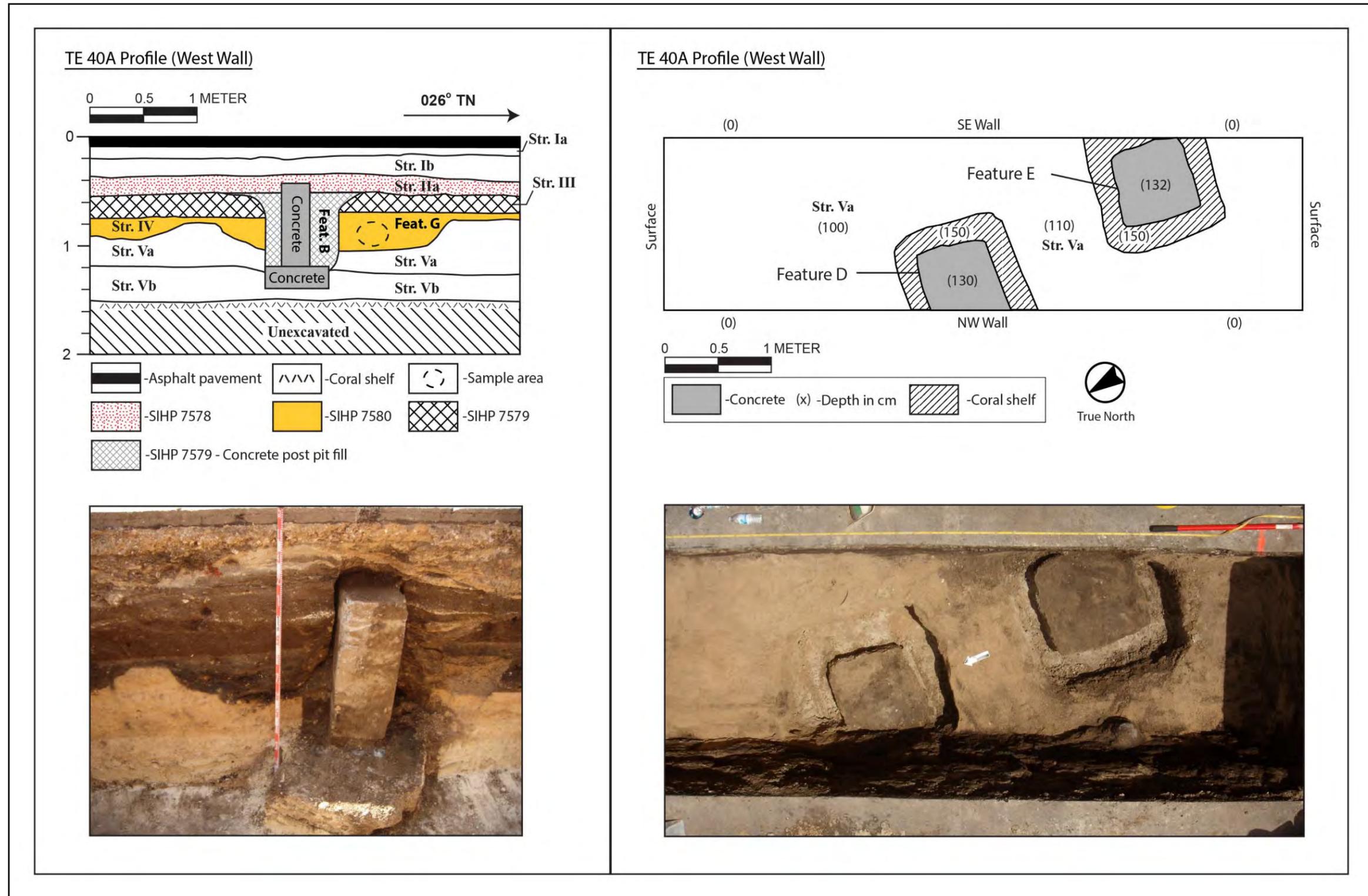


Figure 240. Representative profile and plan view of buried structural remnants (i.e., concrete building foundation) associated with SIHP # -7579

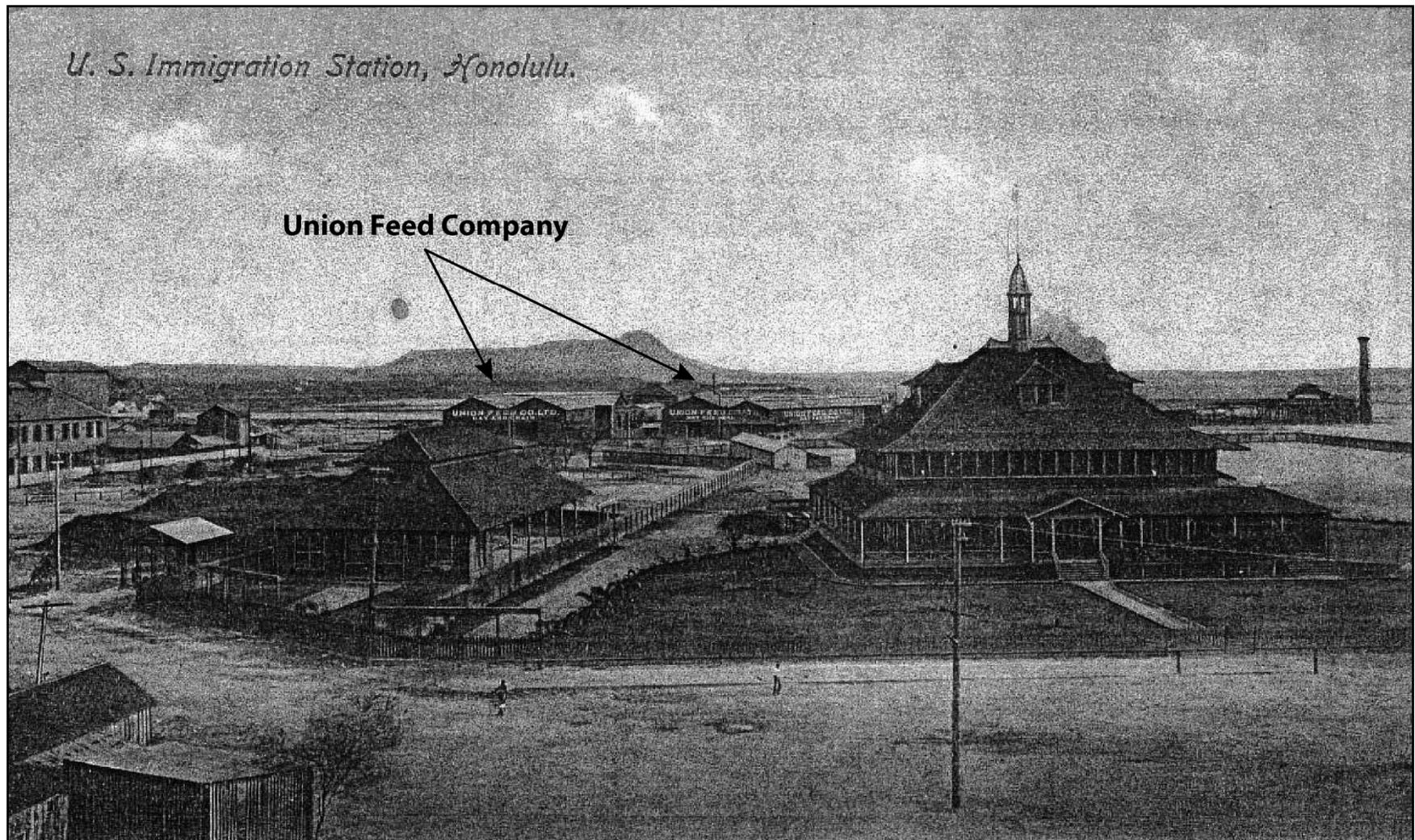


Figure 241. Photograph (ca. 1900) of the Immigration Station at Kaka'ako showing the Union Feed Company in the center background (Hawai'i State Archives)

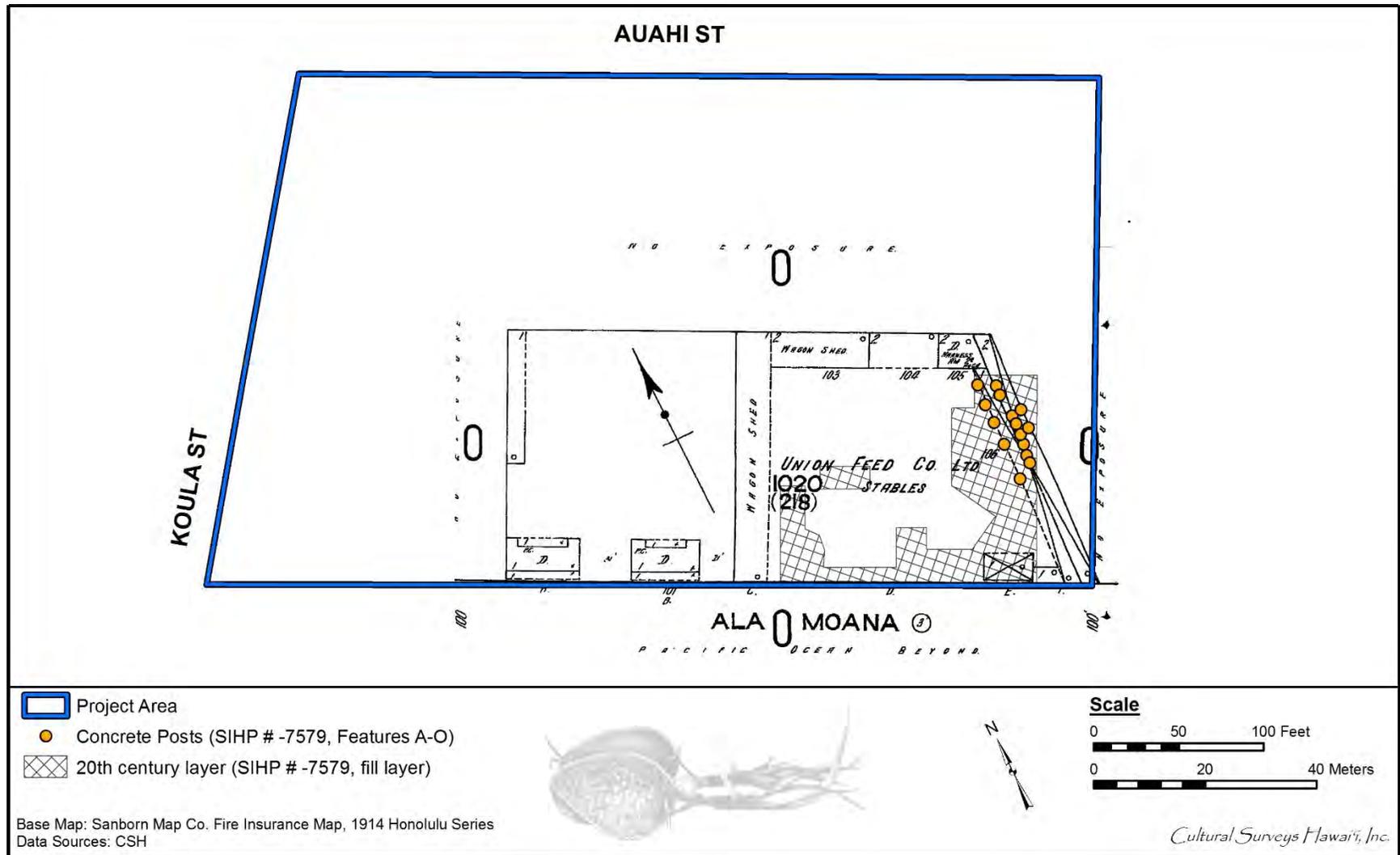


Figure 242. 1914 Sanborn Fire Insurance Map showing SIHP # -7579 cultural layer and SIHP # -7579, Features A-O within the project area

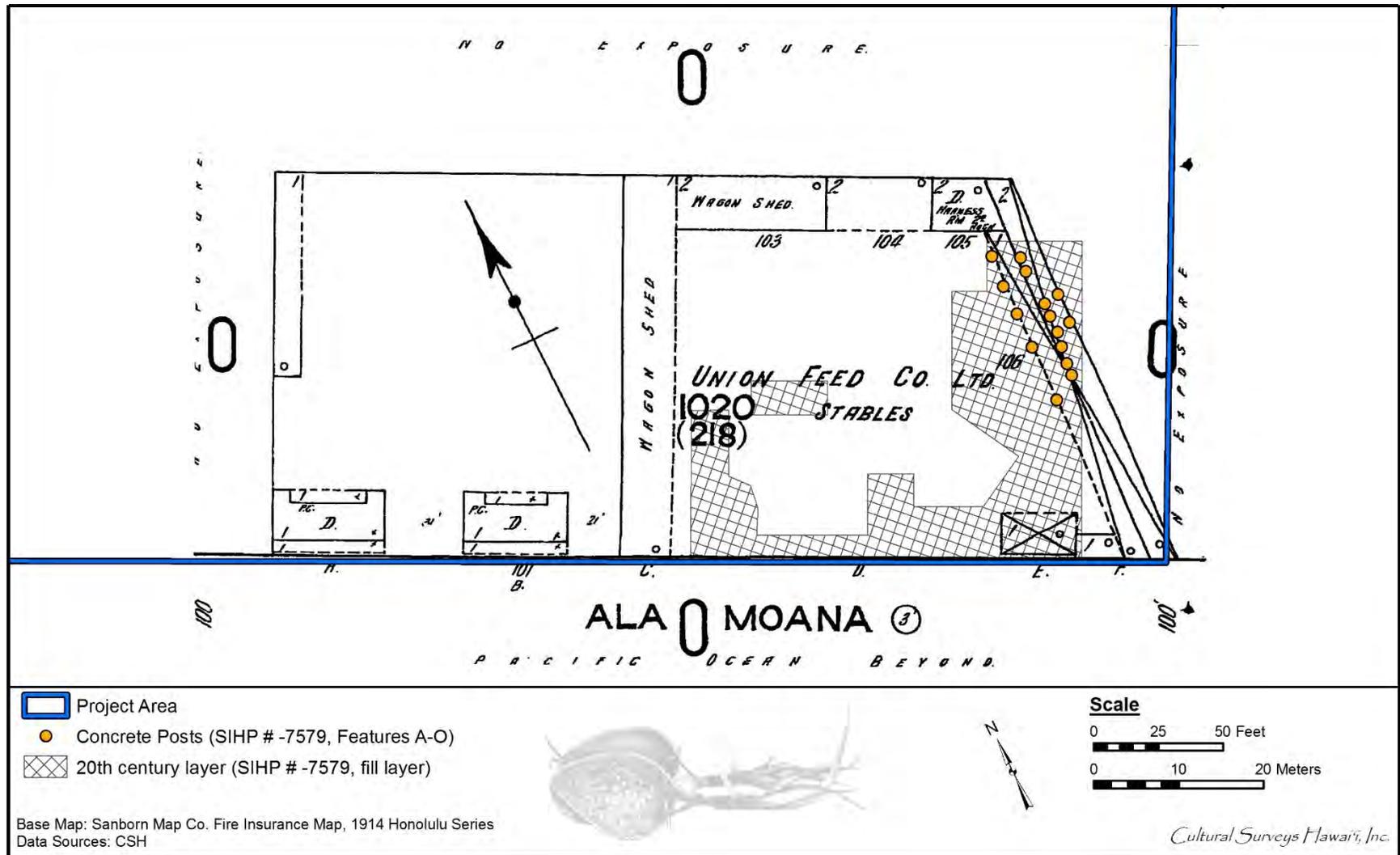


Figure 243. Closeup of the 1914 Sanborn Fire Insurance Map showing SIHP # -7579 cultural layer and SIHP # -7579, Features A-O within the project area in relation to the Union Feed Company within the project area

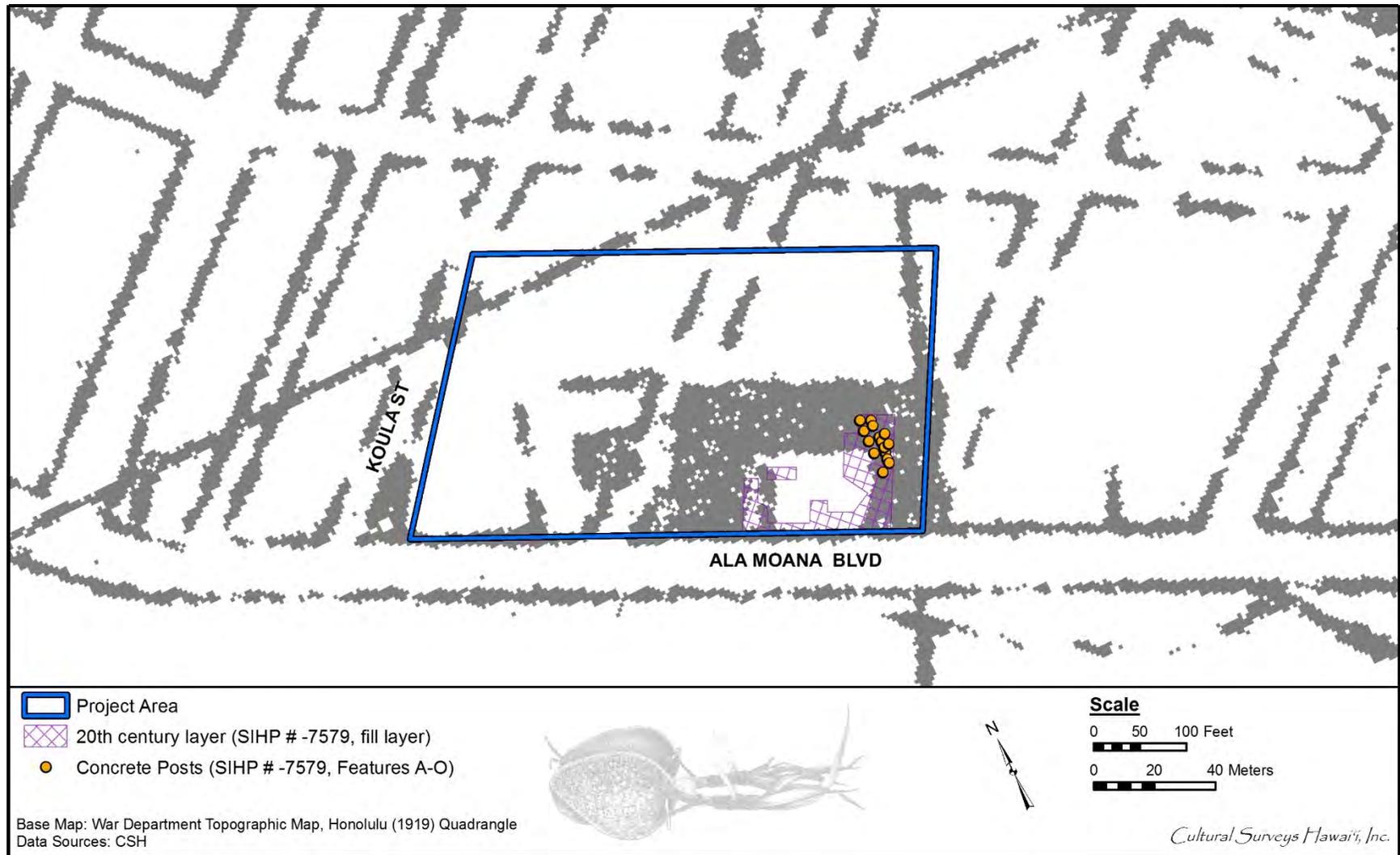


Figure 244. Closeup of the 1919 War Department Topographic Map (Honolulu Quadrangle) showing SIHP # -7579 cultural layer and SIHP # -7579, Features A-O within the project area in relation to the Union Feed Company within the project area

Table 92. SIHP # -7579 Feature Table

Feature	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
A	100 cm long by 100 cm wide	40-150	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A plan view. Historic utility bisects the feature and toppled the rectangular column off its base. The feature originates at the top of Stratum IIa and terminates at the coral shelf. Square concrete block at base of pit.	Concrete column and base	Historic building foundation
B	60 cm long by 55 cm wide	40-140	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A plan view and in west sidewall. The feature originates at the top of Stratum IIa and terminates at the coral shelf. Square concrete block at base of pit.	Concrete column and base	Historic building foundation
C	60 cm wide in profile	60-150	Mixture of Strata IIa, IIb, III, IV, and V sediments	Square-shaped pit feature observed in TE 40A east sidewall. The feature originates at the bottom of Stratum IIa and terminates at the coral shelf. Square concrete block at base of pit.	Concrete column and base	Historic building foundation
D	100 cm long by 100 cm wide	50-150	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in center portion of plan view and in center of NW profile wall of TE 40B. Pit originates in Stratum II (SIHP# -7578, fill layer) and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
E	100 cm long by 100 cm wide	60-150	Mixture of Strata III, IV, Va, and Vb sediments	Square pit feature in plan view and rectangular shaped in SE profile wall of TE 40B. Pit originates in Stratum II (SIHP# -7578, fill layer) and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
F	90 cm long	60-150	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in NW profile of TE 40B. Pit originates in Stratum II (SIHP# -7578, fill layer) and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
G	60 cm long	50-145	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in NW profile of TE 40B. Pit originates in Stratum II (SIHP# -7578, fill layer) and terminates at coral shelf (i.e., limestone bedrock).	Concrete column and base	Historic building foundation
H	100 cm long by 60+ cm wide	70-130 in TE 40C; 40-150 in TE 40H	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in east profile wall of TE 40C and in plan view and in TE 40H plan view. Also observed in plan view of TE 40H. Feature is truncated by Stratum IIb and terminates in Stratum Vb. A square concrete block sits at the base of the pit.	Concrete column and base	Historic building foundation
I	100 cm long by 80 cm wide	50-160	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in plan view of TE 40D. Feature is truncated by a utility pit and intrudes through Stratum IV into Stratum Vb.	Concrete column and base	Historic building foundation
J	30 cm in profile	55-145	Mixture of Strata III, IV, Va, and Vb sediments	Rectangular pit feature observed in East sidewall of TE 40D. Feature is truncated by Stratum Ib and a utility pit and intrudes through Strata III, IV, Va, and Vb.	None observed	Historic building foundation
K	60 cm by 50 cm	60-160	Mixture of Strata IIb, III, IV, Va, and Vb sediments	Square-shaped pit feature observed in TE 40E plan view and in south sidewall. The feature is truncated by Stratum IIb and terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
L	110 cm by 50 cm	50-140	Mixture of Strata II, III, IV, and Vb sediments	Square-shaped pit feature observed in TE 40E plan view and in west sidewall. The upper limit of the pit is truncated by Stratum IIb and the base of the pit terminates in Stratum Vb. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
M	40 cm by 30 cm	50-160	Mixture of Strata III, IV, and V sediments	Square-shaped pit feature observed in TE 40E plan view and in east sidewall. The feature is truncated by Stratum IIb and terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
N	140 cm diameter	70-160	Mixture of Strata III, IV, Va, and Vb sediments	Circular pit feature observed in TE 40E plan view and in north sidewall. The feature is truncated by Stratum IIb and terminates at the coral shelf. Concrete block observed at base of pit.	Concrete column and base	Historic building foundation
O	50 cm long by 30 cm wide	40-130	Mixture of Strata IIa, IIb, III, IV, Va, and Vb sediments	Square-shaped pit feature observed in TE 40H plan view and in east sidewall. The feature is truncated by Stratum IIb and terminates at the marine clay (Stratum Vb). Concrete block observed at base of pit.	Concrete column and base	Historic building foundation

surface atop a natural sand dune. The concrete building foundations were then driven through this fill deposit, all the way down to the solid coral shelf for additional structural support.

Based on stratigraphic provenance and historic map review it is believed that the SIHP # -7579 fill layer and associated building foundations are related to the Union Feed Company which operated at this location beginning circa 1900.

### 4.3.3 SIHP # 50-80-14-7580

<b>TEMPORARY #</b>	CSH 3
<b>FORMAL TYPE:</b>	Subsurface cultural layer and human burials
<b>FUNCTION:</b>	Habitation
<b># OF FEATURES:</b>	27 pit features, 17 subfeatures, and 8 burial finds
<b>AGE:</b>	Pre-Contact to post-Contact (19 <sup>th</sup> century)
<b>DIMENSIONS:</b>	Indeterminate

**DESCRIPTION:** SIHP # -7580 is a subsurface cultural layer observed in the project area within test excavations 5, 8, 9, 11, 12, 20, 32, 35–40, 40A–40H, and 43–47 (Figure 245). It is defined as an area that shows subsurface remnants of pre-Contact and post-Contact activity. The interpolated boundaries of SIHP # -7580, shown on Figure 245, are defined by the trenches wherein the SIHP # -7580 cultural layer and/or the associated human burials were present.

SIHP # -7580 is generally evidenced by an A horizon that developed on naturally deposited Jaucas sand, enriched primarily with traditional Hawaiian cultural material. This A horizon was subsequently buried by historic fill events that brought the surface to its current elevation. The upper boundary of the A horizon was initially truncated during grading that preceded the earliest fill event. Subsequent ground-disturbing activities further removed and/or disturbed portions of the SIHP # -7580 cultural layer and associated pit features.

The cultural layer was documented from 60 to 125 cm below the existing ground surface and consisted of a very dark brown silty sand containing marine shell midden, charcoal, and fire-cracked rock within the stratum. The fire-cracked rock consisted of semi-porous, angular basalt. Traditional Hawaiian artifacts were also present within the cultural layer. These included a basalt core (Acc. # 41), an adze fragment (Acc. # 2), a bone awl (Acc. # 39), an *aku* lure preform (Acc. # 79), and a marine shell gourd stopper (Acc. # 40). A basalt sinker (Acc. # 29) was also collected from naturally deposited marine sand underlying the cultural layer.

While the observed cultural material was predominantly traditional Hawaiian, foreign imported materials were also collected from the cultural layer. These cultural materials were typically encountered within the top 10 cm of the cultural layer or were encountered within subsurface pit features. These included chert flakes (Acc. # 27), a square headed nail (Acc. # 38), an English game chip (Acc. # 80), as well as glass and ceramic fragments. Of these, the collected glass and ceramic fragments date between 1820 and 1890, although one bottle glass fragment has a date range that spans into the 1920s.

#### 4.3.3.1 Subsurface pit features

Twenty-seven features and 17 subfeatures were identified as components of SIHP # -7580. All of these features and subfeatures consisted of subsurface pit features. Alphabetic feature designations were given to fire pits and other features of particular interest (Table 93). Numeric subfeature designations were assigned to postmolds and pit features of unknown function (Table 94 and Figure 246).

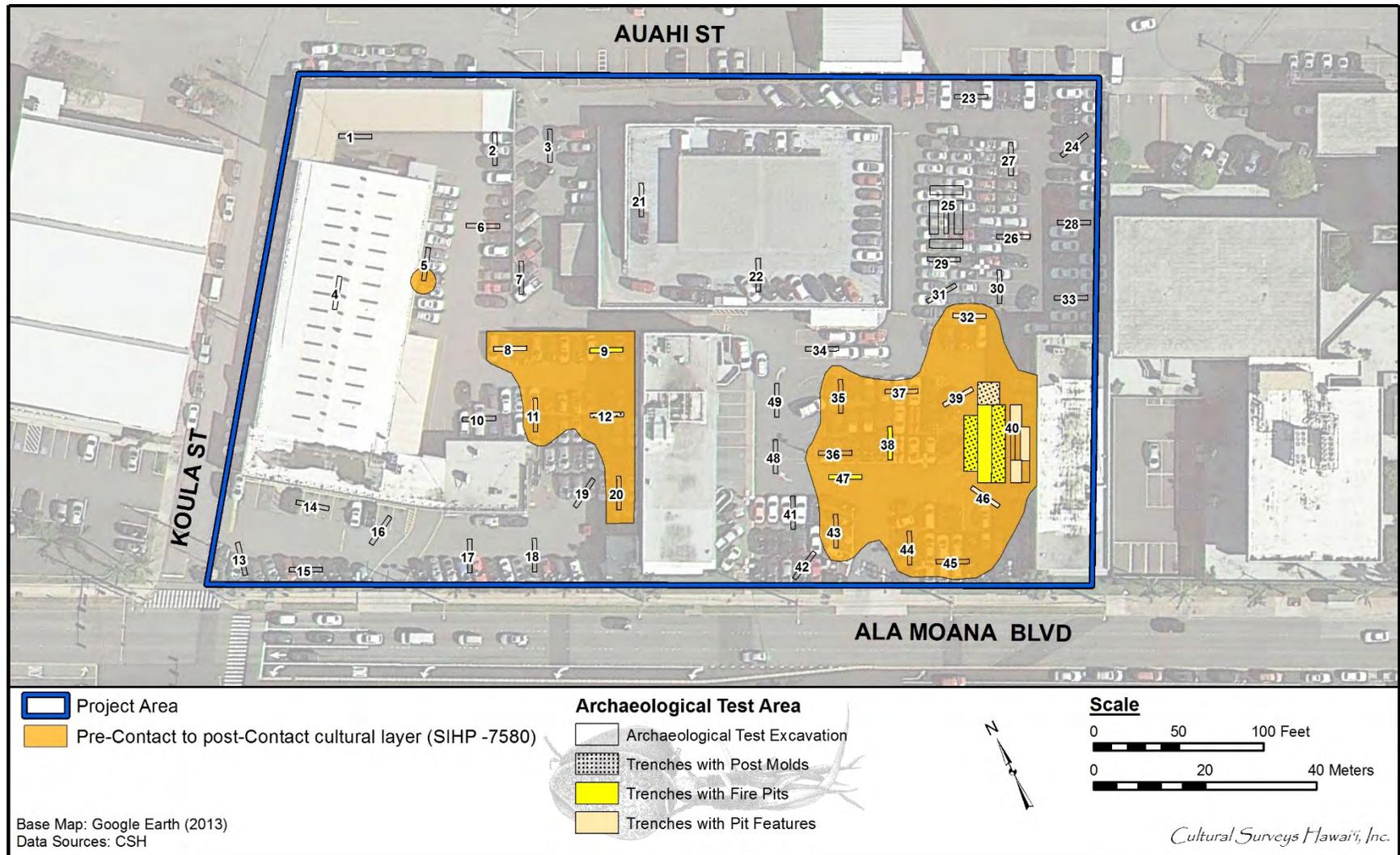


Figure 245. Distribution of SIHP # -7580 throughout the project area

Table 93. SIHP # 50-80-14-7580 Feature Table

Feature	Horizontal Extent	Vertical Extent (cmts)	Pit Fill	Description	Cultural Material	Function
A	45 cm diameter	130-170	Pit fill consists of Stratum Vb sediments	Feature consists of a circular concentration of fishbone and charcoal observed within northeast sidewall of TE 8. No pit outline observed. Feature was observed to be isolated within Stratum Vb. The entire feature was sampled and screened (approx. 3 gallons).	Fishbone and charcoal (collected)	Refuse pit
B	120 cm long x 55+ cm wide	110-140	Mixture of Strata IV and V sediments	Amorphous pit feature observed within the north sidewall and in plan view of TE 9. Feature originates from Stratum IV and intrudes into Stratum Vb. Base of feature was lined with charred basalt cobbles.	Fire-cracked rock (basalt), marine shell midden, charcoal, and faunal bone (pig)	Fire pit/Food preparation
C	60 cm long by 35 cm wide	100-130	Mixture of Strata III and IVa sediments	Oblong-shaped pit feature observed in TE 32 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Basalt fire-cracked rock, a pig tooth, and charcoal	Fire pit/Food preparation
D	60 cm diameter	100-130	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 32 plan view. Feature originates from Stratum III and intrudes into Stratum IVa.	Glass fragments (not collected)	Unknown
E	80 cm long by 70 cm wide	80-110	Strata II and IIIa sediments	Amorphous-shaped pit feature observed in the northeast sidewall of TE 38 and in plan view. Feature originated in Stratum II and intrudes into Stratum IIIa.	Basalt fire-cracked rock, assorted marine shell midden, and charcoal	Fire pit/Food preparation
F	45 cm diameter	85-115	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 39 plan view. The feature originates from Stratum III and intrudes into Stratum IVa.	Marine shell midden, charcoal, and metal fragments	Unknown
G	210 cm long by 50 cm wide	70-105	Mixture of Strata IV and Va sediments	Bowl-shaped pit feature observed in TE 40A plan view and in west sidewall. The feature originates from Stratum IV and intrudes into the underlying Jaucas sand (Str. Va). The central portion of this feature has been bisected by SIHP # -7578, Feature L.	Fire-cracked rock (basalt), charcoal and marine shell midden, fish bone	Fire pit/food preparation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
H	50 cm across in profile	80-100	Mixture of Strata IV and Va sediments	Bowl-shaped pit feature observed in west sidewall profile of TE 40C. Feature originates in Stratum IV and intrudes into Stratum Va. A 3-gallon sample was screened.	Sparse marine shell midden, <i>kukui</i> nut shell, dog tooth, fire-cracked rock (basalt), and charcoal (only charcoal collected)	Fire pit/Food preparation
I	180 cm long by 90 cm wide	90-115	Strata IV and VA sediments	Amorphous-shaped pit feature observed in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. A 10-gallon sample was collected and screened.	Marine shell midden, fire-cracked rock (basalt), burnt coral cobbles, and sparse charcoal; charcoal and marine shell midden collected	Fire pit/Food preparation
J	35 cm diameter	80-100	Strata IV and VA sediments	Circular pit feature observed in plan view. Feature originates in Stratum IV and intrudes into Stratum Va. A 4-gallon sample was collected and screened.	Sparse marine shell midden, fire-cracked rock (basalt), and charcoal (not collected)	Fire pit/Food preparation
K	260 cm long by 140 cm wide	80-120	Strata IV and VA sediments	Amorphous-shaped pit feature observed in plan view and west sidewall of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. Sixteen gallons of sediment were collected and screened. Base of feature was lined with charred coral cobbles and pebbles.	Large concentrations of charcoal and marine shell midden; a gourd stopper (shell) and calcium carbonate crystalline cobble manuport also observed; all cultural material collected from sample area	Postmold/Fire pit/Food preparation
L	155 cm long by 140 cm wide	80-100	Strata IV and Va sediments	Amorphous-shaped pit feature observed in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. An 8-gallon sediment sample was collected and screened.	Sparse marine shell midden, charcoal, and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
M	80 cm long by x 30 cm wide	75-110	Strata IV and Va sediments	Semi-circular-shaped pit feature in plan view and bowl shaped in east sidewall of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va.	Sparse charcoal and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
N	170 cm long by 50 cm wide	90-110	Strata IV and Va sediments	Amorphous-shaped pit feature in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va.	Sparse marine shell midden and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
O	320 cm by 260 cm	80-95	Mixture of Strata IV and Va sediments	Observed in plan view of TE 40E. Two linear features connected by three postmolds, forming a 90-degree angle. An outline of a semi-circle extends from the northern edge of the feature. The pit feature originates in Stratum IV and intrudes into Stratum Va.	Charcoal observed in postmolds	Unknown (possible outline of a surface structure)
P	40 cm diameter	75-90	Mixture of Strata IV and Va sediments	The feature is bowl shaped in north sidewall and circular in plan view of TE 40E. The pit feature originates in Stratum IV and intrudes into Stratum Va.	Marine shell midden, charcoal, and basalt fire-cracked rock	Fire pit/Food preparation
Q	100 cm by 110 cm	70-90	Mixture of Strata IV and Va sediments	Amorphous pit feature observed in plan view and west sidewall of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened from the feature.	Marine shell midden, <i>kukui</i> nut shell, charcoal, and fire-cracked rock (basalt) (collected)	Fire pit/Food preparation
R	120 cm diameter	70-100	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and profile of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. Ten-gallon sample collected and screened.	Charcoal, marine shell midden, and fire-cracked rock (basalt) (not collected)	Fire pit/Food preparation
S	55 cm diameter	75-105	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. A 15-gallon sample collected and screened.	A basalt flake, dog tooth, marine shell midden, and charcoal (collected)	Fire pit/Food preparation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
T	160(L) x 10(W)	75-85	Mixture of Strata IV and Va sediments	Linear pit feature observed in plan view of TE 40F. Feature originates within Stratum IV and intrudes into Stratum Va. Sampled but no cultural material observed.	No cultural material was observed.	Unknown (possible outline of a former structure)
U	110 cm by 120 cm	75-90	Mixture of Strata IV and Va sediment	Amorphous pit feature observed in plan view of TE 40F. The pit originates in Stratum IV (cultural layer) and was intrusive into Stratum Va (Jaucas sand). A ten-gallon sample collected and screened.	Glass fragments, sparse charcoal, fire-cracked rock (basalt), slag, and marine shell midden (not collected)	Fire pit/Food preparation
V	60 cm diameter	80-100	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened.	Marine shell midden, fish bone, and charcoal; all cultural material collected	Fire pit/Food preparation
W	50 cm long by 40 cm wide	80-105	Mixture of Strata IV and Va sediments	Oblong pit feature observed in plan view of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 5-gallon sample was collected and screened.	Marine shell midden, fish bone, and charcoal; all cultural material collected	Fire pit/Food preparation
X	120 cm long by 70 cm wide	80-100	Mixture of Strata IV and Va sediments	Oblong pit feature observed in plan view and east profile of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 10-gallon sample was collected and screened.	Sparse charcoal, shell midden, and fire-cracked rock (basalt) observed but not collected	Fire pit/Food preparation
Y	270 cm long by 120 cm wide	80-115	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and west profile of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. A 20-gallon sample was collected and screened.	Charcoal, metal, glass fragments, fire-cracked rock (basalt), and sparse marine shell observed but not collected	Fire pit/Food preparation

Feature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
Z	90 cm diameter	80-125	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view and east sidewall of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Va. Five gallons of sediment were collected and screened.	Sparse charcoal, shell midden, and fire-cracked rock (basalt) observed but not collected	Fire pit/Food preparation
AA	85 cm diameter	85-115	Strata IV and Va sediments	Circular pit feature observed in plan view and in north sidewall of TE 47. Feature originates from Stratum IV and intrudes into Stratum Va. Ten gallons of sediment were collected and screened.	Moderate charcoal, fire-cracked rock (basalt), and sparse marine shell observed, but not collected	Fire pit/Food preparation

Table 94. SIHP # 50-80-14-7580 Subfeature Table

Subfeature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
1	20 cm diameter	120-160	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view. Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
2	20 cm diameter	120-140	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view. Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
3	20 cm diameter	120-130	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view. Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
4	25 cm diameter	115-150	Mixture of Strata IV and V sediments	Circular pit feature observed in TE 12 plan view. Feature originates in Stratum IV and intrudes into Stratum V.	None observed	Postmold
5	55 cm diameter	80-110	Mixture of Strata II and IIIa sediments	Circular shaped pit feature observed in TE 38 plan view. Feature originated in Stratum II and intrudes into Stratum IIIa.	Sparse marine shell midden and charcoal	Unknown
6	50 cm long	80-100	Mixture of Strata II and IIIa sediments	Rectangular pit feature observed in the northeast sidewall of TE 38 and in plan view. Feature originated in Stratum II and intrudes into Stratum IIIa.	Sparse marine shell midden and charcoal	Unknown
7	20 cm diameter	85-110	Mixture of Strata III and IVa sediments	Circular pit feature observed in TE 39 plan view. The feature originates from Stratum III and intrudes into Stratum IVa.	Sparse marine shell midden	Unknown (possible postmold)
8	160 cm long by 15 cm wide	90-115	Mixture of Strata IV and Va sediments	Linear pit feature observed in plan view and SE profile of TE 40B. Feature originates in Stratum IV and intrudes into Stratum Va. The entire feature was sampled and screened (approx. 3 gallons).	Sparse marine shell midden and charcoal (not collected)	Unknown

Subfeature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
9	15 cm diameter	85-100	Mixture of Strata IV and Va sediments	Circular pit feature observed within the plan view of TE 40B. Feature originates from base of Str. IV and intrudes into Str. Va. The entire feature was sampled and screened.	None observed	Unknown
10	240 cm long by 160 cm wide	80-115	Mixture of Strata IV and Va sediments	Amorphous-shaped feature in plan view, and bowl-shaped in SE and NW profile walls of TE 40B. Feature originates in Stratum IV and intrudes into Stratum Va. A 19-gallon sample was screened.	Sparse charcoal, marine shell midden, and fire-cracked rock (basalt) (not collected)	Unknown
11	35 cm across	90-115	Mixture of Strata IV and Va sediments	Square-shaped feature in NW profile of TE 40B. Feature originates in Stratum IV and intrudes into Stratum Va. A 4-gallon sample was screened.	Charcoal and marine shell midden (collected), fire-cracked rock (basalt) (not collected)	Unknown
12	80+ cm diameter	105-120	Mixture of Strata IV and V sediments	Circular-shaped pit feature observed in east profile of TE 40C and in plan view. Feature originates near the base of Str. IV and intrudes into Str. Va. A 5-gallon sample was screened.	Sparse marine shell midden, and charcoal flecking (not collected)	Unknown
13	45 cm diameter	85-95	Mixture of Strata IV and Va sediments	Circular-shaped pit feature observed in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. A 3-gallon sediment sample was collected and screened.	None observed	Postmold
14	20 cm diameter	90-100	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40D. Feature originates in Stratum IV and intrudes into Stratum Va. A 1-gallon sediment sample was collected and screened.	None observed	Postmold

Subfeature	Horizontal Extent	Vertical Extent (cmbs)	Pit Fill	Description	Cultural Material	Function
15	20 cm diameter	80-90	Mixture of Strata IV and Va sediments	Circular pit feature observed in plan view of TE 40D. Feature originates from base of Str. IV and intrudes into Stratum. Va. The entire feature was screened (approx. 1 gallon).	None observed	Postmold
16	10 cm by 10 cm	80-90	Mixture of Strata IV and Va sediments	Square-shaped pit feature observed in plan view. Feature originates at base of Str. IV and intrudes into Str. Va. Entire feature was screened (approx. 1.5 gallons).	None observed	Postmold
17	20 cm wide by 60 cm long in profile	85-145	Mixture of Strata IV through Vb sediments	Narrow linear pit feature observed in east profile of TE 40G. Feature originates in Stratum IV and intrudes into Stratum Vb.	None observed	Postmold
18	20 cm diameter	80-105	Mixture of Strata III and IVa sediments	Circular-shaped pit feature observed in east sidewall of TE 46. Feature originates in Stratum III and intrudes into Stratum IVa.	None observed	Postmold



Figure 246. Representative photographs of SIHP # -7580, Features (top) and Subfeatures (bottom)

Approximately 81% (22) of the identified pit features within the “feature” category consisted of fire pits, with 45% (10) of these determined to have been utilized for food production. The size and shape of these fire pits vary considerably with the largest (Feature K) measuring 400 cm long by 380 cm wide and 40 cm deep, and the smallest (Feature J) having a 35 cm diameter and 20 cm depth. These pits were characterized as fire pits as opposed to *imu* (earth ovens) based on their contents (i.e. presence and quantity of charcoal, ash, fire-cracked rocks and/or fire-altered rocks).

The remaining pit features within the “feature” category consist of a refuse pit (Feature A), and four pits of unknown function. Two of unknown function (Features D and F) were circular in shape, but did not provide enough data to determine function. The remaining two unknown features (Features O and T) consist of linear outlines imprinted into the sterile marine sand, and may correspond to the outlines of surface structures once erected atop the now buried A horizon cultural layer (SIHP # -7580).

Approximately 53% (9) of the identified subfeatures are postmolds. All of the postmolds originated in the SIHP # -7580 cultural layer and were excavated into the underlying naturally deposited sediments. The average diameter of the postmolds was 20 cm. None of the postmolds assigned as subfeatures contained cultural material.

Approximately 47% (8) of the identified subfeatures were of an unknown function. These pit features did not have any definitive shape, and contained sparse cultural material that was consistent with the general distribution of cultural material throughout the cultural layer (SIHP # -7580). Thus an exact function could not be assigned to these subfeatures.

Pit features associated with SIHP # -7580 of particular interest include Features A, K, and O. SIHP # -7580, Feature A consists of a fishbone and charcoal concentration observed within naturally deposited marine clay. The fishbone consisted of Puffer fish (42.7 g). This feature is of interest because it was present below the cultural layer and thus appears to have been created prior to the formation of the cultural layer. The feature was observed within the northwest sidewall of TE 8. The feature was circular in shape, with a 45 cm diameter in profile and present from 130 to 170 cm below the existing surface. No pit outline was observed. The fishbone and charcoal was collected from the feature for analysis (see Section 5 Results of Laboratory Analysis). Wood taxa analysis on charcoal from Feature A identified *kukui* (Polynesian introduction) and two unknown taxa. Radiocarbon dating on these samples provided a calibrated 2-sigma date of AD 1811-1920 (72.3% probability). SIHP # -7580, Feature A consists of an isolated feature that is not stratigraphically associated with the greater SIHP # -7580 cultural layer; however it does contain similar cultural material and an overlapping radiocarbon date range. As it is a small isolated feature, designating it as its own historic property seemed inappropriate. Thus it was decided to combine SIHP 7580, Feature A with the SIHP # -7580 cultural layer.

SIHP # -7580, Feature K consists of a large fire pit utilized for food production. It was observed within TE 40D and TE 40F (Figure 247). The pit originated at the cultural layer and was excavated into the underlying marine sand. The feature had a horizontal extent of 400 cm long by 380 cm wide, and extended from 80 to 120 cm below the existing surface. The base of the feature was lined with charred coral cobbles and pebbles, with concentrations of large chunks of charcoal atop them. A large quantity of marine shell midden and charcoal was observed during sampling of the feature. The midden included *pipipi* (181.3 g), Isognomonidae (23.1 g), Turbinidae (54 g), Strombidae (9.4 g), Hipponicidae (3.4 g), Mytilidae (0.3 g), Tellinidae (1.2 g), Conidae (4 g),

Nassarridae (1.3 g), Ranellidae (4.4 g), Naticidae (1.6 g), fish bone fragments (0.1 g), kukui nut shell fragments (0.1 g), urshin shell fragments (0.8 g), and crab claw fragments (0.7 g). Also present was basalt fire-cracked rock, burnt coral cobbles, a gourd stopper (shell) (Acc. # 40), and a calcium carbonate crystalline cobble manuport (Acc. # 63) (see Section 5 Results of Laboratory Analysis). Wood taxa analysis of charcoal collected from Feature K identified *hau* (native). Radiocarbon dating on these samples provided a calibrated 2-sigma date of AD 1489-1604 (69.6% probability). This feature is of interest due to its large size, high volume of midden, presence of artifacts, and construction style (base of the feature is lined with coral cobbles and pebbles). All of these factors are suggestive of a feature that may have been utilized as a reusable *imu* and/or was a component of a cooking house. Both of which indicate a potential of more formal permanent habitation at this site as opposed to more transient habitation associated with a small fishing camp.

SIHP #-7580, Feature O was observed in TE 40E. It consisted of two linear features connected by four postmolds, forming a 90-degree angle (Figure 248). An outline of a semi-circle extends from the northern edge of the feature. The entire feature, the 90-degree angle and semi-circle, measure approximately 320 cm by 260 cm, and were observed from 80 to 95 cm below the existing surface. The four postmolds associated with this feature have an average diameter of 20 cm, and were observed from 80 to 110 cm below the existing surface. No cultural material was present within SIHP # -7580 Feature O with the exception of charcoal collected at the base of the northernmost postmold. Wood taxa analysis of charcoal collected from Feature K identified one unknown taxa. Radiocarbon dating on these samples provided a calibrated 2-sigma date of AD 1805-1935 (68.3% probability). The size and shape of this feature, along with the presence of multiple associated postmolds suggests SIHP # -7580, Feature O may be the outline of a surface structure. The function of this structure remains unknown.

Wood taxa identification of six charcoal samples collected from the SIHP # -7580 cultural layer and Features A, B, K, and O documented the presence of numerous native and Polynesian introduced species, as well as post-Contact alien species introductions. Ethnobotanical research indicates all of the identified plant species present within the cultural layer had the potential to have been utilized by Hawaiians and/or foreign residents.

Radiocarbon dating analysis on five samples from Features A, B, O, K and the cultural layer suggest that occupation associated with SIHP # -7580 occurred during both the late pre-Contact and the early post-Contact periods. However, additional radiocarbon analysis is recommended to more tightly date the SIHP # -7580 cultural layer and associated pit features.

#### 4.3.3.2 Burials

SIHP # -7580 includes eight human burials (Burial Find #s 1–8). These burials consist of a cluster of early post-Contact coffin burials located within the southern corner of the project area (Figure 249 and Figure 250). The burial pits originate within the SIHP # -7580 cultural layer and extend into the underlying marine sand and clay.

Table 95 provides a summary of each of the burial finds. Detailed discussions and maps for each burial find are provided within Section 4.2.2 Test Excavation Documentation above.

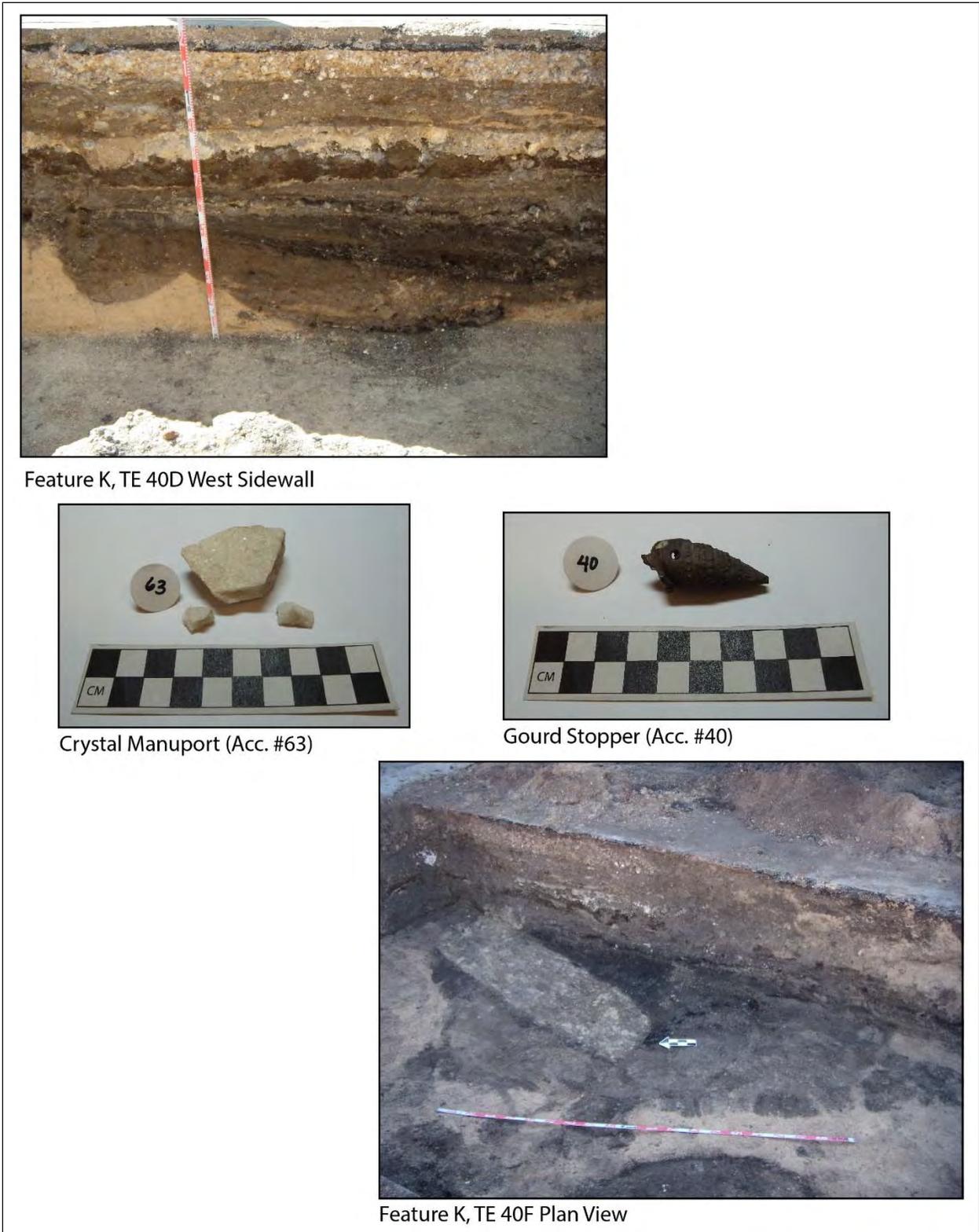


Figure 247. SIHP # -7580, Feature K photo collage



Feature O, view to east



Feature O, view to south

Figure 248. SIHP # -7580, Feature O, plan view photos from TE 40E

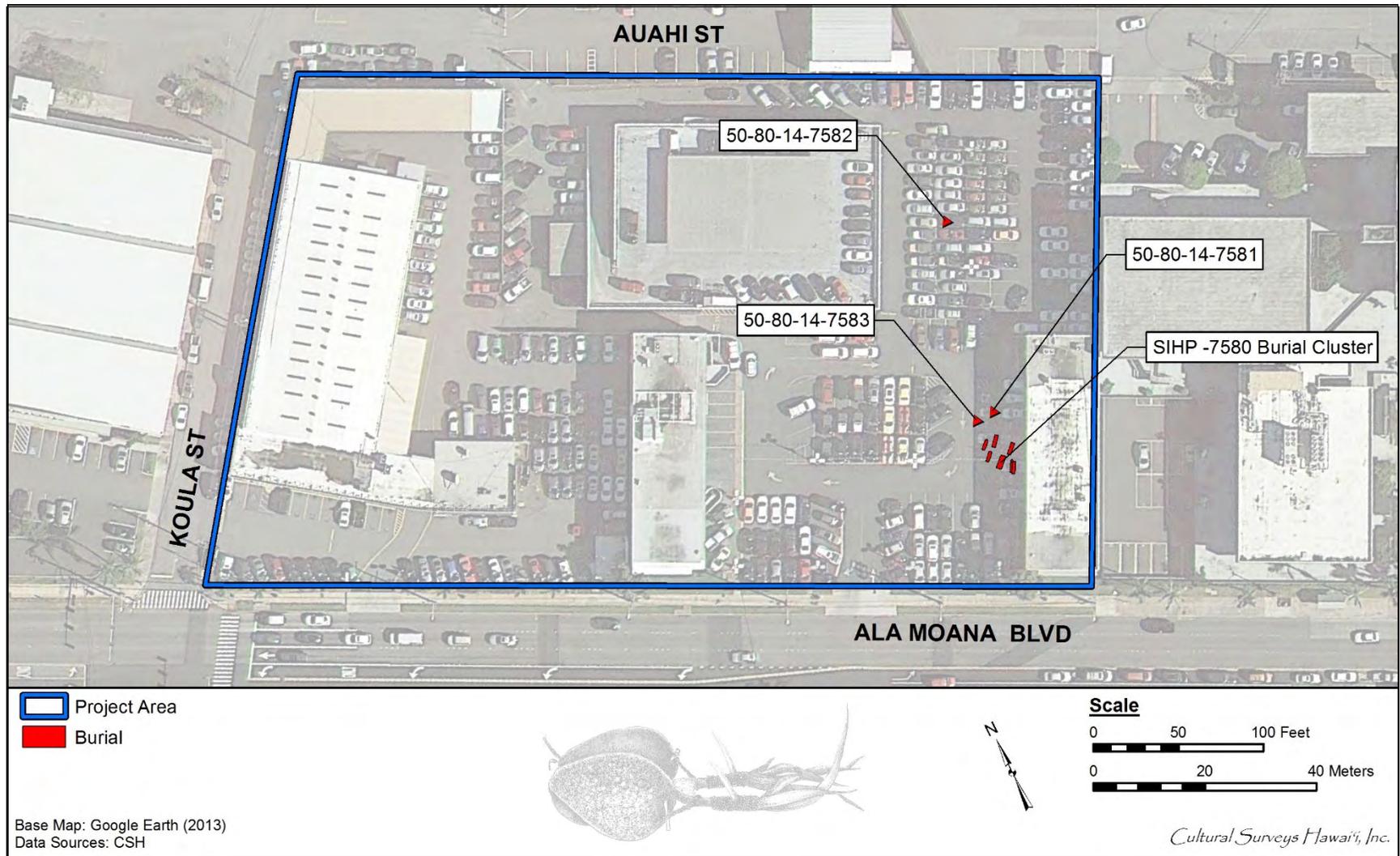


Figure 249. Locations of burial finds within the project area

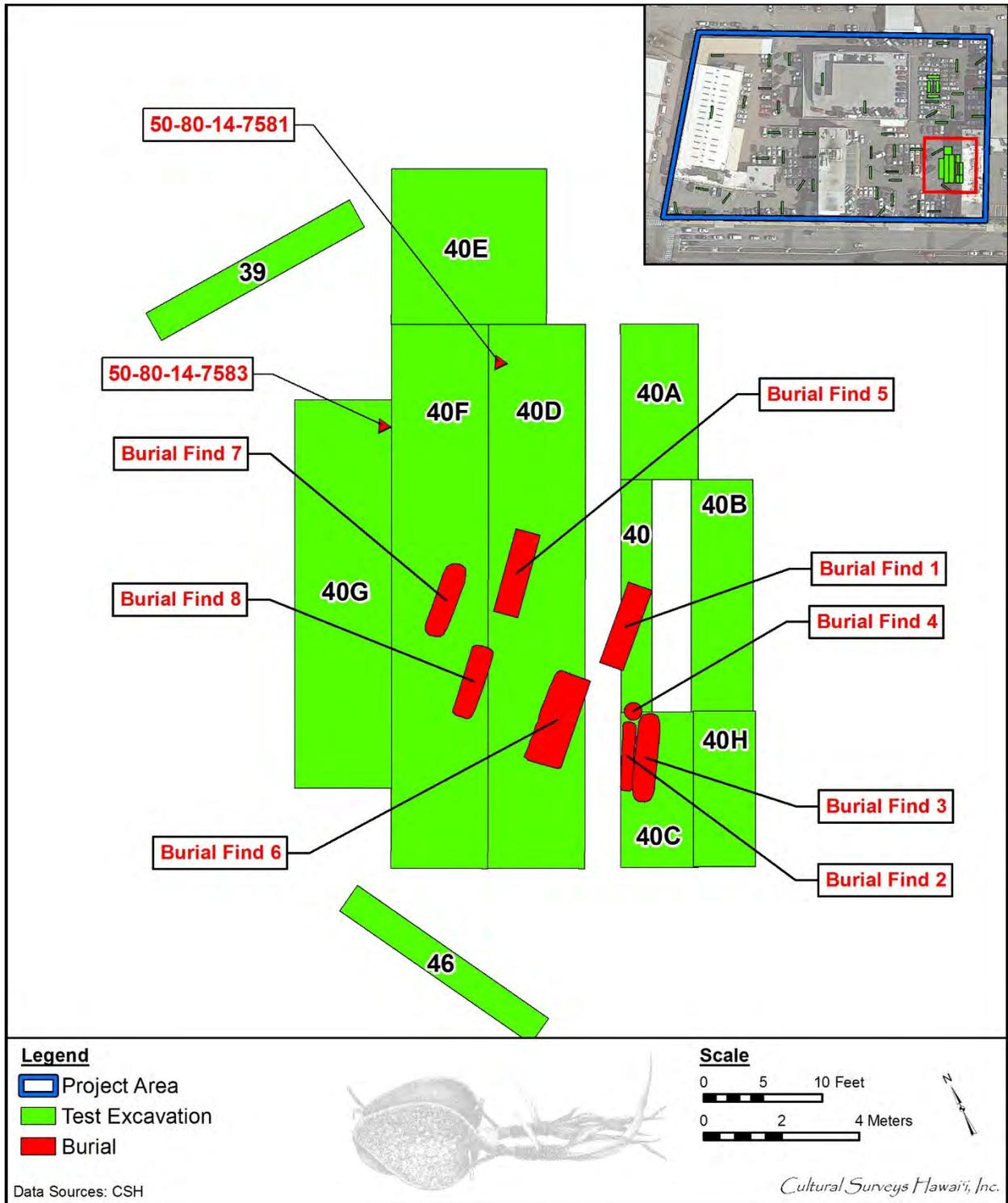


Figure 250. Location of SIHP # -7580 Burial Find #s 1-8

Table 95. SIHP # 50-80-14-7580 Burial Finds

Burial Find #	Test Excavation	Depth	Stratigraphic Provenience	Burial Style	Interpreted Age
1	40	Burial pit from 70-150 cmbs Burial at 140 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand.	Intact coffin burial, adult; rectangular burial pit with tight corners; extended supine position; feet oriented <i>makai</i> (SW); skeletal remains observed atop coral shelf.	19 <sup>th</sup> c.
2	40C	Burial pit from 60 cmbs- Burial at 120 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand.	Intact coffin burial, juvenile; rectangular burial pit; extended supine position; feet oriented <i>mauka</i> (NE); skeletal remains observed within Jaucas sand.	19 <sup>th</sup> c.
3	40C	Burial pit at 60 cmbs- Burial at 120 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand.	Intact coffin burial, adult; rectangular burial pit; extended supine position; head oriented <i>makai</i> (SW); coffin outline and decomposing metal hardware observed; skeletal remains observed within Jaucas sand.	19 <sup>th</sup> c.
4	40C	Burial at 100 cmbs	Burial is directly below an early twentieth century sewer line and extends into an unexcavated sidewall. Burial pit is difficult to discern.	Partial skull, fragmented by utility disturbance.	19 <sup>th</sup> c.
5	40D	Burial pit from 60-140 cmbs Burial at 120 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand and clay.	Intact coffin burial, adult; rectangular burial pit with tight corners; extended supine position; head oriented <i>mauka</i> (NE); deteriorating coffin wood observed; bone button observed in pit fill; skeletal remains observed within marine clay.	19 <sup>th</sup> c.

Burial Find #	Test Excavation	Depth	Stratigraphic Provenience	Burial Style	Interpreted Age
6	40D	Burial pit from 60-120 cmbs Burial at 110 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand and clay.	Intact coffin burial, adult; top of burial pit delineated with a rectangular mound constructed of coral boulders and cobbles; large square-cut coral block inset into the ground and marks/delineates the top SW edge of burial; rectangular burial pit with tight corners; extended supine position; head oriented <i>makai</i> (SW); no coffin outline observed; skeletal remains observed within marine clay.	19 <sup>th</sup> c.
7	40F	Burial pit from 70-150 cmbs Burial at 150 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand and clay.	Intact coffin burial, adult; rectangular burial pit; extended supine position; feet oriented <i>mauka</i> (NE); coffin outline and metal nails observed; skeletal remains observed within marine clay.	19 <sup>th</sup> c.
8	40F	Burial pit from 80-140 cmbs Burial at 143 cmbs	Burial pit originates within SIHP # -7580 cultural layer and extends into underlying marine sand and clay.	Intact coffin burial, adult; rectangular burial pit; extended supine position; feet oriented <i>mauka</i> (NE); coffin outline observed; skeletal remains observed within marine clay.	19 <sup>th</sup> c.

**4.3.4 SIHP # 50-80-14-7581**

<b>TEMPORARY #</b>	CSH 4
<b>FORMAL TYPE:</b>	Traditional Hawaiian bundle burial
<b>FUNCTION:</b>	Burial
<b># OF FEATURES:</b>	N/A
<b>AGE:</b>	Pre-Contact
<b>DIMENSIONS:</b>	N/A

**DESCRIPTION:** SIHP # -7581 consists of a traditional Hawaiian bundle burial located within the southern corner of the project area, and just northeast of the SIHP # -7580 historic coffin burial cluster (see Figure 250). The burial was discovered during the excavation of TE 40D (see Section 4.2.2.48 Test Excavation 40D above).

SHIP # -7581 consists of an intact bundle burial. The burial pit was very subtle and not visible in profile, only in plan view. The burial pit originates from culturally sterile Jaucas sand and extends into marine clay (see Figure 183). The burial pit is circular in shape, measures approximately 50 cm in diameter, and was observed from 135 to 160 cm below the existing surface. Pit fill consisted of a mixture of the sterile marine sand and clay.

Observed skeletal elements comprising SIHP # -7581 included arm and leg long bones (femur, tibia, humerus, ulna, etc.) and ribs (see Figure 183). It is believed all other skeletal elements (cranium, vertebrae, phalanges, etc.) are likely present beneath the meticulously stacked and sorted long bones. The human skeletal remains were encountered at 140 cm below the existing surface.

SIHP # -7581 likely comprises the complete skeletal remains of an adult individual. The burial is believed to be of pre-Contact origin based on its burial style (bundle burial) and its stratigraphic provenience. SHIP # -7581 is believed to be of some antiquity as its origin appears to pre-date the formation of SIHP # -7580, a pre- to early post-Contact cultural layer (i.e., the SIHP # -7581 burial pit originates below the cultural layer within culturally sterile marine sand). Ethnicity is presumed to be probable Hawaiian based on its geographic and archaeological context.

**4.3.5 SIHP # 50-80-14-7582**

<b>TEMPORARY #</b>	CSH 5A
<b>FORMAL TYPE:</b>	Disarticulated human skeletal remains
<b>FUNCTION:</b>	Isolated find location
<b># OF FEATURES:</b>	N/A
<b>AGE:</b>	Indeterminate
<b>DIMENSIONS:</b>	N/A

**DESCRIPTION:** SIHP # -7582 consists of disarticulated human skeletal remains identified within a non-burial context. The remains consist of a single adult molar and a possible cranial fragment located within the northeastern corner of the project area during the excavation of TE 25 (see Figure 249 and Section 4.2.2.25 Test Excavation 25 above).

SIHP # -7582 was identified during documentation of a horse burial (SIHP # -7578, Feature G) associated with SIHP # -7578, an early to mid-twentieth century cultural layer developed within and atop imported fill sediment. Investigation of the horse burial (SIHP # -7578, Feature G) revealed that the human remains (SIHP # -7582) were limited to the pit fill of the horse burial. It was determined the human remains were associated with imported historic land reclamation fill; and the human remains were within a secondary burial context, being disturbed during removal and transport of fill sediment. Age and ethnicity could not be determined due to the absence of primary burial context and the fragmented nature of the remains.

**4.3.6 SIHP # 50-80-14-7583**

<b>TEMPORARY #</b>	CSH 5B
<b>FORMAL TYPE:</b>	Disarticulated human skeletal remains
<b>FUNCTION:</b>	Isolated find location
<b># OF FEATURES:</b>	N/A
<b>AGE:</b>	Indeterminate
<b>DIMENSIONS:</b>	N/A

**DESCRIPTION:** SIHP # -7583 consists of disarticulated human skeletal remains identified within a non-burial context. The remains consist of a partial adult human mandible located within the southern corner of the project area, just north of the SIHP # -7580 burial cluster (see Figure 249 and Figure 250). SIHP # -7583 was identified during the excavation of TE 40G (see Section 4.2.2.51 Test Excavation 40G above).

SIHP # -7583 was discovered within an imported fill layer (Stratum IIIa) associated with early twentieth century land use within the project area (SIHP # -7579). The human remains (SIHP # -7583) were determined to be isolated and are believed to have been imported from an off-site location. Age and ethnicity could not be determined due to the absence of primary burial context and the fragmented nature of the remains.

## Section 5 Results of Laboratory Analysis

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### 5.1 Artifacts

#### 5.1.1 Historic Artifacts

Seventy-two historic artifacts/artifact fragments were collected from project area excavations, consisting of one bone button (Figure 251), one borosilicate cup (Corning brand) (Figure 252), one celluloid hair barrette (Figure 253), five chert flakes (Figure 254), one possible chert flake, six white clay pipe fragments (Figure 255), one unglazed porcelain tube fragment, one piece of slag, three metal nails (Figure 256), one metal tube, one copper handle (Figure 257), one mother-of-pearl game counter (Figure 258), two plastic toy cars (Figure 259), one plastic advertising Chevron 1948 calendar card (Figure 260), one bakelite chopstick fragment, one unglazed porcelain wall tube insulator (two fragments) (Figure 261), one slate pencil fragment, one slate roofing tile, one glass marble, one glass bead, one glass vial/medicine dropper, 20 glass bottle/bottle fragments, 17 ceramic tableware fragments, and one stoneware bottle. These artifacts were collected from SIHP # -7578 cultural layer (Table 96), SIHP # -7579 cultural layer (Table 97), and SIHP # -7580 cultural layer (Table 98).

Most of the items can be dated to only a general period. Several of these items—such as the bone button and the white clay tobacco smoking pipe fragments are common on nineteenth century Hawaiian archaeological sites, for example the 333 tobacco pipe stem fragments found at the Kekaulike Ewa project in Chinatown (Kennedy et al. 1994:140; Riley et al. 1995:121). The date ranges for the datable pipe stems (based on manufacturer's marks) was calculated as A.D. 1820-1867 (Riley et al. 1995:129). Numerous pipes were also found in a large deposit and family cemetery at the Marin Towers in Honolulu (Goodwin et al. 1995:55) and at the 800 Nuuanu Block in Honolulu for the 1830s-1860s period and the 1860s to 1890s period (Lebo and McGuirt 2000:98, 138). One special item was a mother-of-pearl carved counter/chip. These chips were commonly made by Chinese craftsmen for their own games, and then exported to Europe, Great Britain, and America between 1720 and 1840. In Europe and America, they were used in certain types of card and board games that needed chips for betting. In 1820, new types of games became popular in which tricks or the number of games won were counted, and betting chips were no longer needed. By the 1840s, the demand for these types of chips in the West had dropped drastically (Roskin 1999), although the Chinese probably continued to make them for their own gambling activities.

Others artifacts were manufactured in the twentieth century, such as the 1948 Chevron calendar card, the plastic toy truck and car (post-1930), six glass milk bottles (1905-ca. 1940), and a Corning Pyrex watch cup. The Corning brand mug and hand warmer was used by sailors in the U.S. Navy during World War II in the 1940s and into the Korean War era in the early 1950s (Rogove and Steinhauer 1993:23).

SIHP # -7578, Feature K in Trench 40E contained more than 25 bottles, mainly milk bottles. Not all of the bottles were collected; five bottles, one of each type present, were collected (Figure 262). In addition, a similar milk bottle was collected in Trench 28, from SIHP # -7578, Feature H (Figure 263). These bottles were made for the Honolulu Dairyman's Association of



Figure 251. Bone button (Acc. # 64) collected from SIHP # -7578 Feature K



Figure 252. Borosilicate Corning watch cup (Acc. # 10) collected from SIHP # -7578



Figure 253. Celluloid hair barrette (Acc. # 45) collected from SIHP # -7579



Figure 254. Chert flakes (Acc. # 27) collected from SIHP # -7580

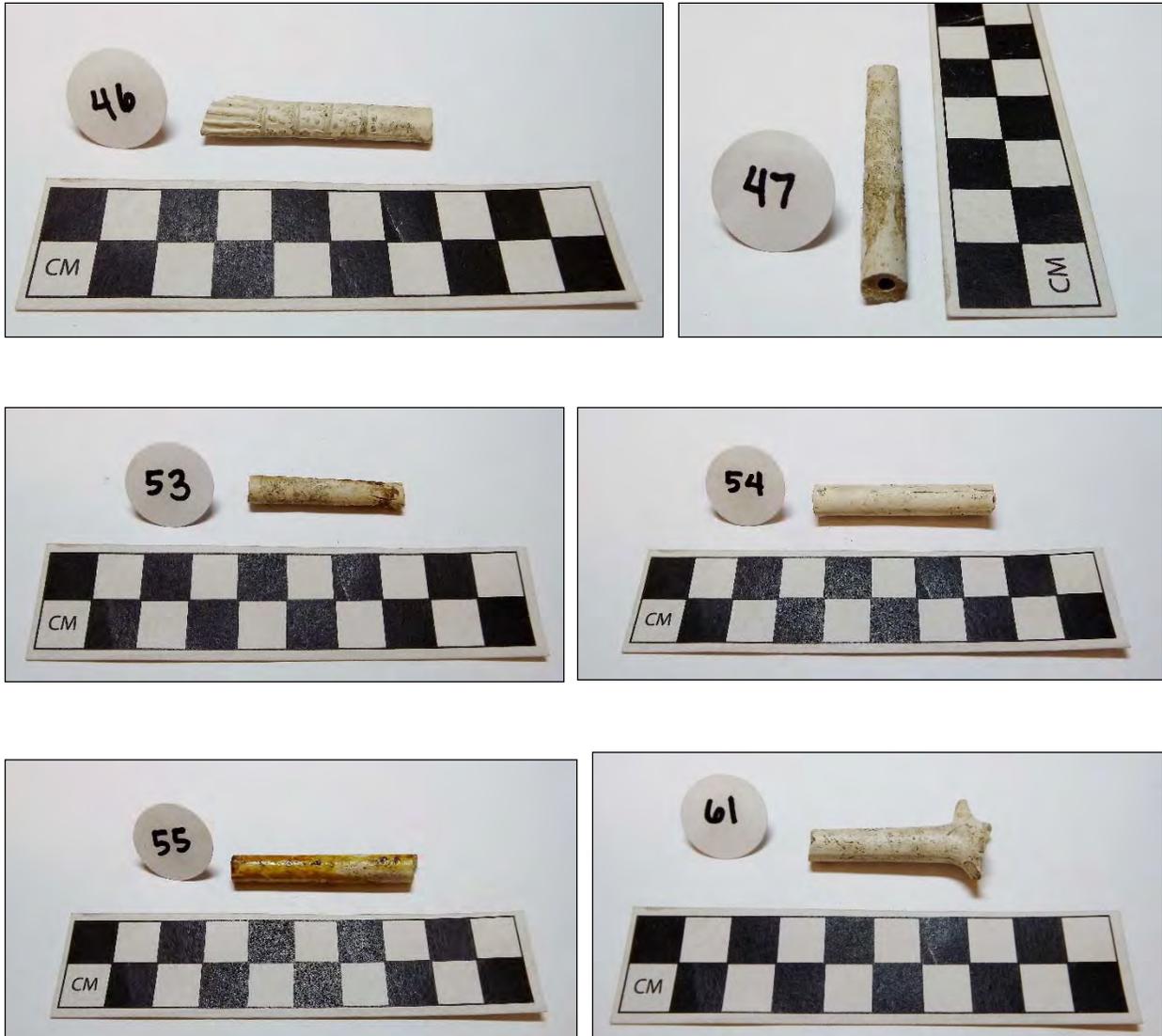


Figure 255. White clay tobacco pipe fragments (nineteenth century) (Acc. #s 46, 47, 53, 54, 55, and 61) collected from SIHP # -7579



Figure 256. Metal square-head nail (Acc. # 38) collected from SIHP # -7580



Figure 257. Copper handle (Acc. # 67) collected from SIHP # -7578, Feature K



Figure 258. Mother-of-pearl game counter/chip (pre-1840s manufacture) (Acc. # 80) collected from SIHP # -7578

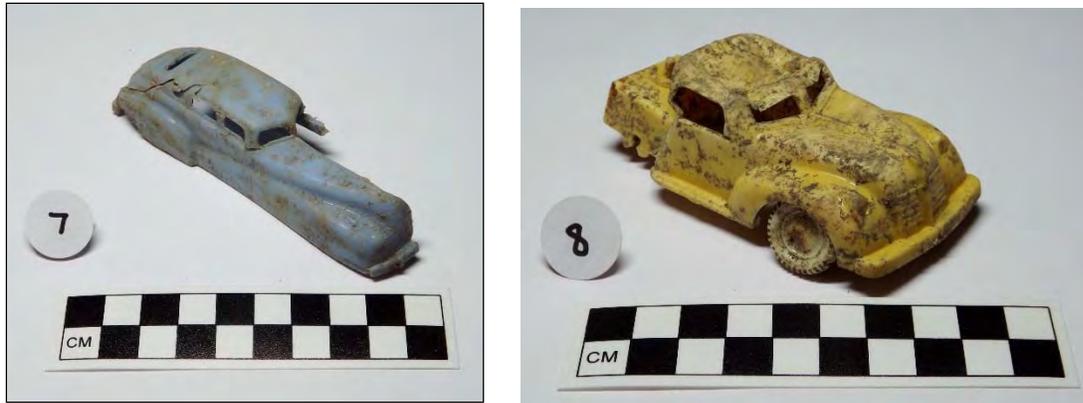


Figure 259. Plastic toy cars (Acc. #s 7–8) collected from SIHP # -7578, Feature F



Figure 260. Plastic Chevron 1948 calendar card (Acc. # 9) collected from SIHP # -7578, Feature F



Figure 261. Unglazed porcelain wall tube electrical insulator (Acc. # 4) collected from SIHP # -7578, Feature F

Table 96. Artifacts Collected from SIHP # 50-80-14-7578 Cultural Layer and Associated Pit Features

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
4	18	Str. II	40-80	2	8.8				2.0	Ceramic	American; 20th c.	Unglazed porcelain wall tube electrical insulator
5	18	Str. II	40-80	1		12.5			4.2	Glass	Euro-American	Clear complete medicine bottle, square base, two-piece cup mold, prescription lip
6	18	Str. II	40-80	1		20.5			9.2	Glass	American; 1908-1920	Aqua green complete medicine bottle, oval base, two-piece cup mold, patent ABM lip; embossed vertically on body: "LYDIA E. PINKHAM'S / VEGETABLE COMPOUND"; product first marketed in 1873; added # ozs. to labeling ca. 1920 (Linden 2014)
7	20	Fea. F	60-150	1	10.7		3.3			Plastic	Euro-American; post-1930	Toy car
8	20	Fea. F	60-150	1	9.3		5.1			Plastic w/metal	Euro-American; post-1930	Toy car
9	20	Fea. F	60-150	1	8.8		5.8			Plastic	American; 1948	Chevron Pocket Calendar 1948 "CHEVRON/ SUPREME GASOLINE"
10	20	Fea. F	60-150	1		8.6			9.2	Borosilicate	American; 1940s-1950s	Corning military watch cup
11	28	Fea. H	25-75	1		13.5			6.4	Glass	American; 1905-ca. 1940	Clear milk bottle fragment, base to lip, oval base, two-piece cup mold, ABM capseat finish (post-1905); embossed on body horizontally: "HALF PINT/PROPERTY OF/DIAMOND HEAD/DAIRY HONOLULU/T.H./S. SHIMIZU," base: "S.S 2"

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
64	40E	Fea. K	35-105	1	1.3		1.3	0.4		Bone	Euro-American	Bone button; four holes machine drilled
65	40E	Fea. K	35-105	1	5.1		1.2	0.5		Slate	Euro-American	Slate pencil
66	40E	Fea. K	35-105	1	6.0				0.7	Glass	Euro-American	Glass vial/medicine dropper
67	40E	Fea. K	35-105	1	11.3		1.9	0.5		Metal	Euro-American	Copper handle
68	40E	Fea. K	35-105	1		13.7			6.4	Glass	American; 1905-ca. 1940.	Clear milk bottle, oval base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "HALF PINT/PROPERTY OF/HONOLULU/DAIRYMEN'S/ASSN./HONOLULU T.H.," on base: "H.D."
69	40E	Fea. K	35-105	1		13.7			6.4	Glass	American; 1905-ca. 1940.	Clear complete milk bottle, oval base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "HALF PINT/RAWLER ICE CREAM CO. LTD./CHOCLO"
70	40E	Fea. K	35-105	1		13.7			6.4	Glass	American; 1905-ca. 1940.	Clear complete milk bottle, oval base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "HALF PINT/PROPERTY OF/DIAMOND HEAD DAIRY/HONOLULU/T.M./S. SHIMIZU," base: "SS 38"
71	40E	Fea. K	35-105	1		13.7			6.4	Glass	American; 1905-ca. 1940.	Clear complete milk bottle, oval base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "HALF PINT/WAIALAE NUI FARM/PLEASE/RETURN/BOTTLE/ HONOLULU," base: "62"

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
72	40E	Fea. K	35-105	1		18.2			6.4	Glass	American; 1905-ca. 1940.	Clear complete milk bottle, oval base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "PROPERTY OF/HONOLULU/DAIRYMEN'S/ASSOCIATION/12Oz.," base: "HD"
82	48	Fea. L	40-120	1			20.3			Shale	Euro-American	Broken slate roofing tile; four drilled holes, two are 1.0 cm in diameter, and two are 0.6 cm diameter
83	48	Fea. L	40-120	1	7.3	18.7	5.5			Glass	American; 1915-1950s	Clear glass complete shampoo bottle; rectangular base, two-piece cup mold, ABM sprinkler lip (pre-1950); embossed on sides vertically: "LUCKY TIGER /MFG. CO./ KANSAS CITY, MO.," "LUCKY TIGER /FOR SCALP/AND HAIR," on base: "I" and "N" in a square; advertised first in 1918, trademarked 1939 (Fike 1987:68; Obear-Nester Glass Co. mark for 1915-1978
84	48	Fea. L	40-120	1		24.3			6.0	Glass	American; 1942	Clear glass complete soda bottle, round base, two-piece cup mold, ABM crown finish, embossed "PEPSI COLA" vertically on shoulder, six times on stippled surface; on base: Owens-Illinois icon, "14 B 42/DES. PAT. 120277"
85	49	Fea. N	35-95	1		19.7			5.0	Glass	American; 1908-ca.1940s	Clear glass complete soda bottle, round base, two-piece cup mold, ABM crown finish; embossed with "HONOLULU SODA WATER LTD. TRADEMARK REGISTERED" on shoulder with four Maltese Cross emblems above; on base: Maltese cross; by the 1940s, most of the O'ahu bottlers had switched from embossing to ACL labels

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
86	49	Fea. N	35-95	1		18.0			7.0	Glass	American; 1905-ca. 1940.	Clear glass complete milk bottle, round base, two-piece cup mold, ABM capseat finish; embossed horizontally on body: "PROPERTY OF/HONOLULU/DAIRYMEN'S/ASSOCIATION/ONE PINT," base reads: "HD" with a small "12" in the center of the HD
87	49	Fea. N	35-95	1		22.2			9.0	Glass	American; post-1929	Amber glass washing fluid bottle, complete, round base, two-piece cup mold, ABM bead finish; embossed twice horizontally on shoulder "SANI-CLOR," on base: "CROWN PRODUCTS CORP. /SANI-CLOR/SAN FRANCISCO"; trademarked in 1929 by the California Bleaching Water Co., Inc., San Francisco (Legal Force Trademarks 2014)
88	49	Fea. N	35-95	1		23.8			6.0	Glass	Japanese; ca. post 1940	Amber glass complete beer bottle, round base, two-piece cup mold, ABM crown finish; embossed with "KB" (K is over the B) and Japanese characters on shoulder; Japanese Kirin beer bottle; Kirin Brewery Co., Ltd established in 1907, beer bottles with KB logo typical for WWII era, and later, bottles (Ross 2009:12)
89	49	Fea. N	35-95	1						Ceramic	Chinese; 1850 to ca. 1950	Porcelain tableware base fragment; painted overglaze "Four Seasons" (Four Flowers) motif; printed red trademark on back: "HAND PAINT . . ." with a flower in the center

Table 97. Artifacts Collected from SIHP # 50-80-14-7579 Cultural Layer

Acc. No.*	T-#	Str./Fea.	Depth (cmbs)	#	L (cm)	H (cm)	W (cm)	T (cm)	Di. (cm)	Material	Origin; Age	Comments
74	40G	Str. IIIa	45-70	1					17.0	Ceramic	Chinese; 19 <sup>th</sup> c.	Porcelain base to body dish fragment; blue hand-painted motif called "Allah" or "Chrysanthemum"
75	40G	Str. IIIa	45-70	1				0.6		Ceramic	Euro-American; ca. 1840-1900	Refined earthenware (whiteware) tableware rim fragment with blue floral transfer print decoration; whitewares date from 1840 to the present; blue transfer prints were most popular from 1820-1840 and declined at the end of the 19 <sup>th</sup> century (Lebo 1997: G-7)
76	40G	Str. IIIa	45-70	1						Glass	Euro-American	Blue glass round bead (half)
42	40C	Str. III	50-70	1	10.5		5.5	0.6	11.0	Ceramic	Japanese; ca. 1868-1920s	Porcelain rice bowl, footring to rim fragment, hand-painted blue undeglaze decoration on exterior side beginning date based on age of worker immigration to Hawai'i (Nordyke and Matsumoto 1977:162) and end date from Ross (2012:26)
43	40C	Str. III	50-70	1	6.8		5.5	0.4	15.0	Ceramic	Chinese; ca. 1850-1911	Wintergreen (celadon) porcelain rice bowl (body to rim) fragment; beginning date from start of official Chinese worker immigration (Nordyke and Lee 1989:199) and end date from Lister and Lister (1989:48)
44	40C	Str. III	50-70	1	11.7		0.6	0.6		Plastic	Unknown; post-1909	Chopstick Fragment, possibly bakelite, invented 1909 (Spude 2002)
45	40C	Str. III	50-70	1	4.2		1.5	0.2		Celluloid	Euro-American; post-1870	Hair Clip made of celluloid, invented 1869 (Spude 2002)
46	40C	Str. III	50-70	1	4.5		0.8		0.5	White clay	Euro-American; 18th to late 19th c.	Pipe stem w/ Dotted Design, and a bore hole 0.2 cm in diameter
47	40C	Str. III	50-70	1	4.5		0.6		0.5	White clay	Euro-American; 18th to late 19th c.	Pipe stem with a 0.2 cm diameter bore hole.

Acc. No.*	T-#	Str./Fea.	Depth (cmbs)	#	L (cm)	H (cm)	W (cm)	T (cm)	Di. (cm)	Material	Origin; Age	Comments
48	40B	Str. III	50-70	1	10.0		5.5	0.5	7.0	Ceramic	Chinese; ca. 1850-1911	Porcelain rice bowl fragment (footring to body) with hand-painted blue Bamboo motif on exterior side
49	40B	Str. III	50-70	1	8.2		4.2	0.5		Ceramic	Euro-American; ca. 1840-1870	Refined earthenware (whiteware) plate/platter body fragment with blue transfer print Romantic architectural motif; Romantic patterns produced between 1793-1870, with most popular period from 1831-1851 (Samford 1997:6, 14)
50	40B	Str. III	50-70	1	7.5		3.2	0.5	12.0	Ceramic	Euro-American; ca. 1840-1860	Refined earthenware (whiteware) bowl fragment (base to body) with hand-painted thick-line large floral motif in red, green, yellow, and brown; decoration most common on whitewares from 1840-1860 (Lebo 1997:G-7)
51	40B	Str. III	50-70	1	6.4		5.2	0.4		Ceramic	Euro-American; ca. 1840-1880	Plate/platter refined earthenware (whiteware) plate/platter body fragment with red transfer print of a man on a horse; Romantic Patterns most common 1831-1851; red color used 1818-1880 (Samford 1997:20)
52	40B	Str. III	50-70	1	5.8		5.0	0.5		Ceramic	Euro-American; ca. 1840-1870	Refined earthenware (whiteware) plate rim fragment with dark blue floral transfer print and rim decoration; central floral designs made between 1784-1869, most common from 1833-1849 (Samford 1997:6)
53	40B	Str. III	50-70	1	3.5		0.6		0.5	White clay	Euro-American; 18th to late 19th c.	Pipe Stem with a 0.25 cm diameter bore hole.
54	40B	Str. III	50-70	1	4.2		0.8		0.6	White clay	Euro-American; 18th to late 19th c.	Pipe Stem with a 0.2 cm diameter bore hole
55	40B	Str. III	50-70	1	4.8		0.6		0.6	White clay	Euro-American; 18th to late 19th c.	Pipe Stem w/ Yellow Glaze and a 0.2 cm bore hole
56	40B	Str. III	50-70	1	5.8		2.7		2.1	Metal	Euro-American	Iron tube

Acc. No.*	T-#	Str./Fea.	Depth (cmbs)	#	L (cm)	H (cm)	W (cm)	T (cm)	Di. (cm)	Material	Origin; Age	Comments
57	40D	Str. III	45-65	1	9.3		7.4			Ceramic	German; ca. 1846-1914	Stoneware mineral water/ale bottle fragment (body and handle) with salt glaze (body and handle); date from (Lockhart 2010:98)
58	40D	Str. III	45-65	1	8.7		4.2	0.5	12.0	Ceramic	Euro-American; ca. 1840-1870	Refined earthenware (whiteware) bowl fragment (base to body) with blue transfer print floral motif (date from Samford 1997:6, 20)
59	40D	Str. III	45-65	1	4.5		0.5	0.5		Ceramic	Euro-American; ca. 1840-1880	Refined earthenware (whiteware) plate/platter body fragment with red transfer print of a man on a horse; date from Samford (1997:20)
60	40D	Str. III	45-65	2	7.5		6.2	0.5	15.0	Ceramic	Chinese; ca. 1850-1911	Porcelain rice bowl fragment (body to rim) with hand-painted blue Bamboo motif on exterior side
61	40D	Str. IV	65-120	1	4.2		2.2			White clay	Euro-American; 18th to late 19th c.	Pipe Stem with a 0.2 cm diameter bore hole.
62	40D	Str. IV	65-120	1	3.8		1.4	0.7		Stone	Unknown	Possibly Chert

Table 98. Artifacts Collected from SIHP # 50-80-14-7580 Cultural Layer and Associated Pit Features

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
1	8	Str. IV Sample Area 1	110-140	1	3.6		2.0	0.2		Glass	Euro-American; post-1820	Clear bottle glass body fragment
2	9	Str. IV	110	1	6.0		4.2	3.3		Basalt	Hawaiian; traditional	Broken adze
3	9	Fea. B	110-140	8	3.2-11.0	1.6-5.5	2.7-11.0	1.6-5.5		Basalt	Hawaiian; late Pre- and/or early Post-Contact	Fire-cracked rock (vesicular basalt)
18	37	Str. III Sample Area 1	90-110	6	2.6-5.3		1.8-4.0	0.8-2.9		Basalt	Hawaiian; late Pre- and/or early Post-Contact	Fire-cracked rock (vesicular basalt)
19	37	Str. III Sample Area 1	90-110	1	12.4		6.4			Glass	Euro-American; 1820-1890	Dark olive bottle glass fragment, lip to shoulder, applied grooved-ring finish; possible spirits bottle
20	37	Str. III Sample Area 1	90-110	1	3.2		2.0	0.6		Ceramic	Euro-American; post-1830	Yellowware nappy body fragment
21	37	Str. III Sample Area 1	90-110	1	2.7		2.2	0.2		Glass	Euro-American; 19th to 20th c.	Aqua bottle glass body fragment
22	38	Str. II Sample Area 1	74-110	1	1.6		1.1	0.2		Glass	Euro-American; Post-Contact	Olive bottle glass body fragment
23	38	Str. II Sample Area 1	74-110	1	1.2		0.7+		--	White Clay	Euro-American; Post-Contact	Tube fragment (possible pipe stem or some other type of tube; diameter can not be measured for fragment)

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
24	38	Str. II Sample Area 1	74-110	30	1.2-7.1		1.1-4.0	0.6-3.4		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
25	39	Str. III	85-100	1	2.0		1.9	0.4		Basalt	Hawaiian; traditional	Basalt flakes/debitage
26	39	Fea. F	85-115	1	6.4		5.9			Metal	Euro-American; Post-Contact	Slag
27	39	Str. III Sample Area 1	80-110	5	1.2-2.1		0.6-1.1	0.2-0.5		Chert	Euro-American; Post-Contact	Imported chert flakes
28	39	Str. III Sample Area 1	80-110	7	1.8-4.6		1.2-3.8	1.0-2.5		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
29	41	Str. Va	85	1	11.8		9.7			Basalt	Hawaiian; traditional	Sinker/anchor weight?
30	43	Str. II Sample Area 1	80-90	9	2.2-5.4		2.2-4.7	1.5-3.3		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
31	44	Str. III Sample Area 1	90-120	2	2.2-2.3		1.8-1.9	0.9-1.3		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
32	44	Str. III Sample Area 1	90-120	1	2.9		1.3			Metal	Euro-American; Post-Contact	Possible copper nail

Acc. #	TE #	Str./Fea.	Depth (cmbs)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
33	44	Str. III Sample Area 1	90-120	1	3.3		0.9			Metal	Euro-American; Post-Contact	Possible iron nail
34	44	Str. III Sample Area 1	90-120	1	2.1		1.5	0.5		Ceramic	Euro-American; ca. 1840-1870	Refined earthenware (whiteware) tableware body fragment with a purple transfer print floral design on both sides; purple most common from 1814-1867 (Samford 1997:20)
35	45	Str. III Sample Area 1	80-120	21	2.0-2.6		1.3-5.3	1.9-3.2		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
36	45	Str. III Sample Area 1	80-120	2	1.3-3.7		0.7-1.5	0.2-1.2		Basalt	Hawaiian; traditional	Basalt flakes/debitage
37	45	Str. III Sample Area 2	80-100	16	2.1-5.2		1.8-5.0	1.5-3.4		Basalt	Hawaiian; late Pre- and/or early Post- Contact	Fire-cracked rock (vesicular basalt)
38	40C	Str. IV	70-80	1	4.5		1.1	0.8		Metal	Euro-American; Post-Contact	Iron square nail
39	40D	Str. IV	65-120	1	5.0		0.8	0.7		Bone	Hawaiian; traditional	Bone awl
40	40D	Subfea. K	80-100	1	4.2		1.5	1.4		Shell	Hawaiian; traditional	Gourd stopper plug/pendant

Acc. #	TE #	Str./Fea.	Depth (cmts)	#	Length (cm)	Height (cm)	Width (cm)	Thickness (cm)	Diameter (cm)	Material	Origin; Age	Comments
41	40D	Str. IV	75	1	12.0		11.0	10.0		Basalt	Hawaiian; traditional	Core
63	40D	Subfea. K	80-100	1	4.3		3.2	1.1		Calcium carbonate	Hawaiian; traditional	Manuport
73	40F	Fea. S	75-105	1	3.2		1.9	1.0		Basalt	Hawaiian; traditional	Basalt flake
77	40G	Str. IV	60-115	1				0.4		Ceramic	Euro-American, 1850 to late 19 <sup>th</sup> c.	Yellowware tableware body fragment with blue hand-painted mocha decoration, most common by 1850-1860s (date from Lebo 1997:G-10)
78	40G	Str. IV	60-115	1				0.4		Ceramic	Euro-American; 1840-1854	Refined earthenware (whiteware) flatware rim fragment with black transfer print floral decoration; black transfer prints generally date from 1810-1854 (end date from Samford 1997:10).
79	40G	Str. IV	60-115	1						Mother-of-pearl	Hawaiian; traditional	Broken worked <i>aku</i> lure blank
80	40G	Str. IV	60-115	1			2.1	0.1		Mother-of-pearl	Chinese/European; pre-1840s, probably	Game chip/counter, carved mother-of-pearl, rectangular (broken), floral leaf designs within linear and triangular design patterns; made in China for export to England; used as chips or counters for English card games
81	40G	Str. IV	60-115	2					8.0	Glass	Euro-American; 1880-1920s	Dark olive bottle glass, base to body, and shoulder to lip (two fragments); round push-up base; turn-mold; tooled mineral finish

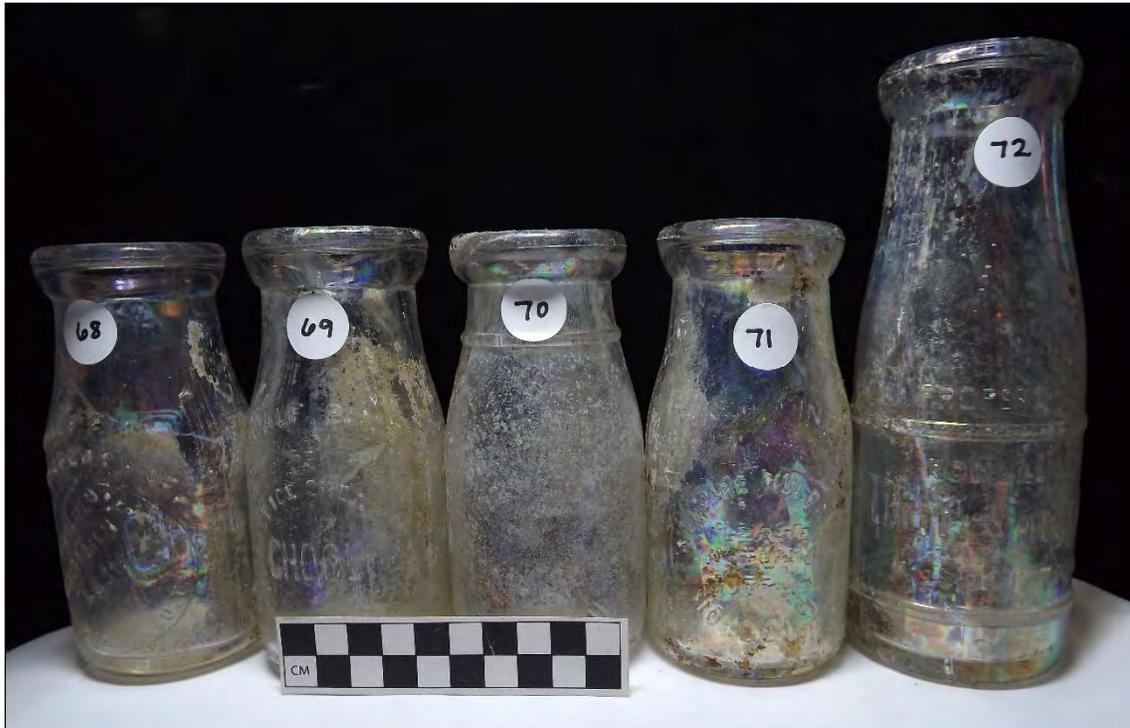


Figure 262. Milk bottles (Acc. #s 68–72) collected from SIHP # -7578, Feature K



Figure 263. Milk bottle from Diamond Head Dairy (Acc. # 11) collected from SIHP # -7578, Feature H

Honolulu (two bottles), for the Diamond Head Dairy of S. Shimuzu (two bottles), for Waialae Nui Farm, and for the Rawley Ice Cream Company of Honolulu. The Diamond Head Dairy and Waialae Nui Farm both had cattle pastures on the east slope of Diamond Head in Waialae Ahupua'a in the early to mid-twentieth century. Honolulu Dairymen's Association was organized by several dairies on O'ahu in 1897. In 1959, this collection of businesses became Meadow Gold Dairies (Sigall 2004:224). The main depot and distribution center for the company's products in the early twentieth century was a company office located on Sheridan Street at the east end of the Kaka'ako area (Scott 1968:392). Rawley's Ice Cream Company had a shop on Alapa'i Street and Beretania (northwest of the project area near the Honolulu Museum of Art). They advertised their products in Hawaiian newspapers as early as 1932 (*Ke Alakai o Hawaii*, 14 January 1932:3). Their advertisement reads (translated from the Hawaiian), "Made in Hawaii by Kamaaina, from cream which is produced locally from Hawaii dairy cows which are well fed, and from sugar grown in Hawaii." In 1938, this company was the first to sell Birdseyes' new frozen foods (Schmitt 1980:80).

The remaining artifacts generally date to a period that spans the early nineteenth to early twentieth century based on the manufacturing techniques used to produce glass bottles and ceramic tablewares, discussed in more detail below.

#### 5.1.1.1 Glass Bottle Analysis

In the last few years, the Bureau of Land Management and the Society for Historic Archaeology have maintained and continually updated a site called "Historic Glass Bottle Identification & Information Website." All descriptive terms for glass bottles and all date ranges for manufacturing techniques for glass bottles were taken from this source, unless otherwise noted (referenced as BLM/SHA 2013).

There are three major technological divisions in the manufacture of glass bottles. From antiquity, bottles have been free-blown (mouth-blown using a blowpipe and no formal mold). In the United States and Canada, free-blown utilitarian bottles generally pre-date 1860. From ca. 1800, bottles were mouth-blown into some type of mold and the mouth of the bottle was finished by hand. Around 1903, Michael Owens invented a fully-automatic bottle machine (ABM) to blow bottles from the base to the lip. The machine was used to blow wide-mouth bottles and jars by 1905 and narrow-necked bottles by 1908. By 1920, in North America use of the fully automatic machines had completely supplanted the older methods of manufacture. Thus the mold-blown era for American bottles extends from ca. 1800 to 1920, which overlaps with the fully automatic machine-made bottle era from ca. 1903 to the present (BLM/SHA 2013\_Glassmaking).

No free-blown bottles were observed or collected during the current investigation. Only two bottles were mold-blown, a probable spirits bottle with an applied lip, a type of finish used from the 1820s to the 1890s (BLM/SHA 2013\_Finishes and Closures) (Acc. # 5; Figure 264) and a dark olive bottle with a tooled lip, a type of finish use from the 1880s to the 1920s. One patent medicine bottle for Lydia Pinkham's Vegetable Compound (Figure 265), a shampoo bottle from the Lucky Tiger Manufacturing Company (Figure 266), a Pepsi Cola bottle (Figure 267), a Honolulu Soda Water bottle (Figure 268), and a Sani-Clor (Figure 269) (a product similar to Clorox Bleach) were all manufactured in an automatic bottle machine (ABM) and thus post-date 1905. One Japanese export beer bottle (Figure 270) used by the Kirin Brewery Company, which



Figure 264. Probable spirits bottle (Acc. # 5) collected from SIHP # -7578



Figure 265. Patent medicine bottle (early twentieth century) for Lydia Pinkham's Vegetable Compound (Acc. # 6) collected from SIHP # -7578



Figure 266. "Lucky Tiger" shampoo bottle (post-1915) (Acc. # 83) collected from SIHP # -7578



Figure 267. Pepsi Cola soda bottle (1940-44) (Acc. # 84) collected from SIHP # -7578



Figure 268. Honolulu Soda Water Ltd. bottle (1903-1940s) (Acc. # 85) collected from SIHP # -7578



Figure 269. Sani-Clor bleach bottle (post-1929) (Acc. # 87) collected from SIHP # -7578



Figure 270. Kirin beer bottle (post-1907) (Acc. # 88) collected from SIHP # -7578



Figure 271. Dark olive bottle, mold-blown (1880s-1920s) (Acc. # 81) collected from SIHP # -7580

was established in 1907, was collected from TE-49. The dark olive mold-blown bottle (Acc. # 81) (Figure 271) is the only bottle collected from SIHP # -7580. All of the remaining bottles were collected from SIHP # -7578.

The six milk bottles collected from SIHP # -7578 (see Figure 262 and Figure 263) were also manufactured in the machine-blown era (post-1905). The six bottles are all embossed with the company information. In 1933, a new type of labeling was invented called “Applied Color Labels” (ACL), or “pyroglazing” which fused pigments directly onto the bottle. This process was much less expensive than embossing, and on common bottles such as for milks, beers, and sodas, ACL labels generally replaced the older embossed labels in the 1930s and early 1940s (BLM/SHA 2013\_Glossary). Thus the six milk bottles probably date from between 1905 to ca. 1940. A seventh post-1905 embossed milk bottle was collected from Test Excavation 49.

#### 5.1.1.2 Ceramic Analysis

Ceramics manufactured in Europe or North America (Euro-American) in the collection consist of refined earthenwares, including seven whiteware fragments with transfer print or hand-painted decorations (Figure 272) and one yellowware fragment with a mocha decoration. One fragment has a painted thick-line polychrome floral design (Acc. # 50). This type of decoration was popular in the late nineteenth century to the early twentieth century (Kirch 1985:316; Severson et al. 2002:278). The transfer print patterns are also commonly found on nineteenth century ceramics. Two stoneware fragments were also collected (Figure 273), a Chinese bowl fragment and a German stoneware bottle fragment with a salt glaze. This type of stoneware bottle with a dark brown salt glaze were made in Germany and usually contained mineral water or ale (Lebo 1997:G-11). They were exported to the United States from around 1846 until the start of World War I in 1914 (Lockhart 2010:98).

In addition to the Euro-American earthenwares and German stonewares, the collection consists of five Asian export wares, two Chinese rice bowl fragments with a hand-painted design referred to as a “Bamboo” motif (Lebo 1997:G-14–G-15) (Acc. #s 48 and 60), one Chinese tableware fragment with a hand-painted “Allah” motif (Acc. # 74), a Chinese tableware fragment with an over the glaze painted decoration called “Four Flowers” (Acc. # 89), and a second Chinese hand-painted rice bowl with a “Bamboo” motif (Acc. # 42) (Figure 274). Chinese export wares found in Hawai'i are usually hand-painted underglaze vessels or overglaze polychrome wares. These are called “tz'u” wares or “Kitchen Ch'ing” wares, which were most commonly made and exported to America during the last half of the Qing Dynasty ca. 1775 to 1911 (Lister and Lister 1989:48). Four of the Asian ceramics were collected from the cultural layer (SIHP # -7579) (Figure 274). The Chinese “Four Flowers” fragment was collected from SIHP # -7578 (Figure 275).

#### 5.1.1.3 Summary of Historic Artifacts

Table 99 summarizes the artifacts by provenience. For SIHP # 7578, all of the artifacts were probably manufactured between 1905 and 1950. There are several more specific dates; a plastic card is dated to 1948, one bottle is dated to 1942, one bottle is dated between 1929 and 1910 and one bottle is dated to after 1940. Thus it is possible that all of the artifacts date from the 1940s. The items consist of toys and household wares and are not burnt, suggesting that they are discarded household items, not incinerator remains.

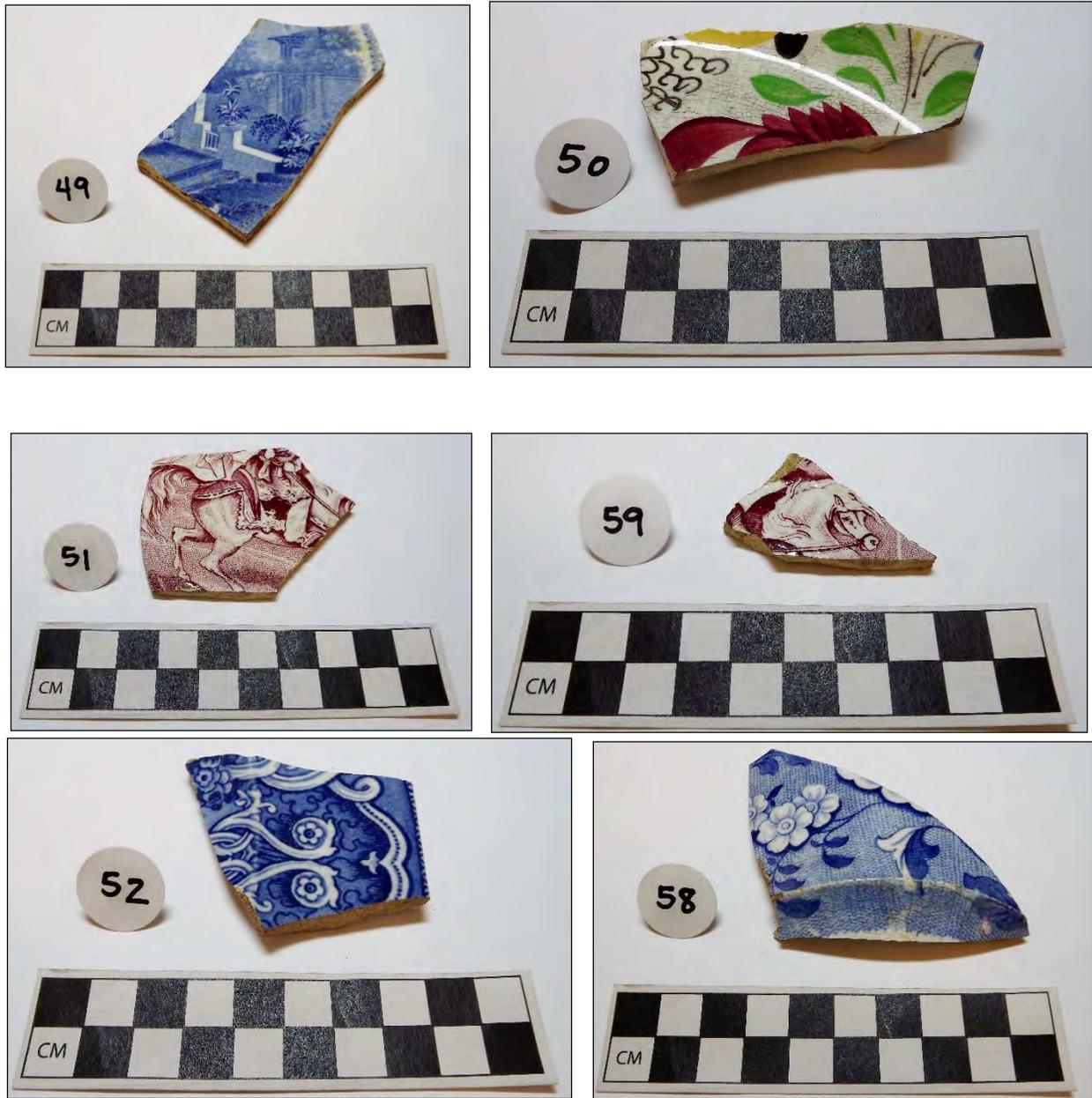


Figure 272. Ceramic Euro-American whiteware fragments with transfer print or hand-painted decorations; Acc. #s 49, 51, 52, 58, and 59 were collected from SIHP # -7579

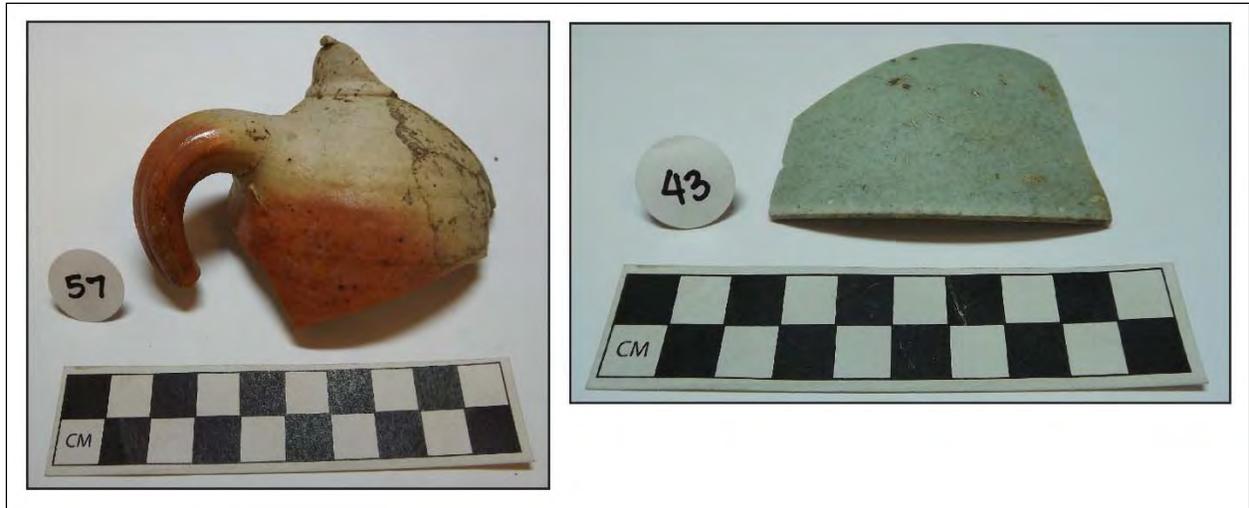


Figure 273. German stoneware bottle fragment and Chinese rice bowl fragment, both collected from SIHP # -7579

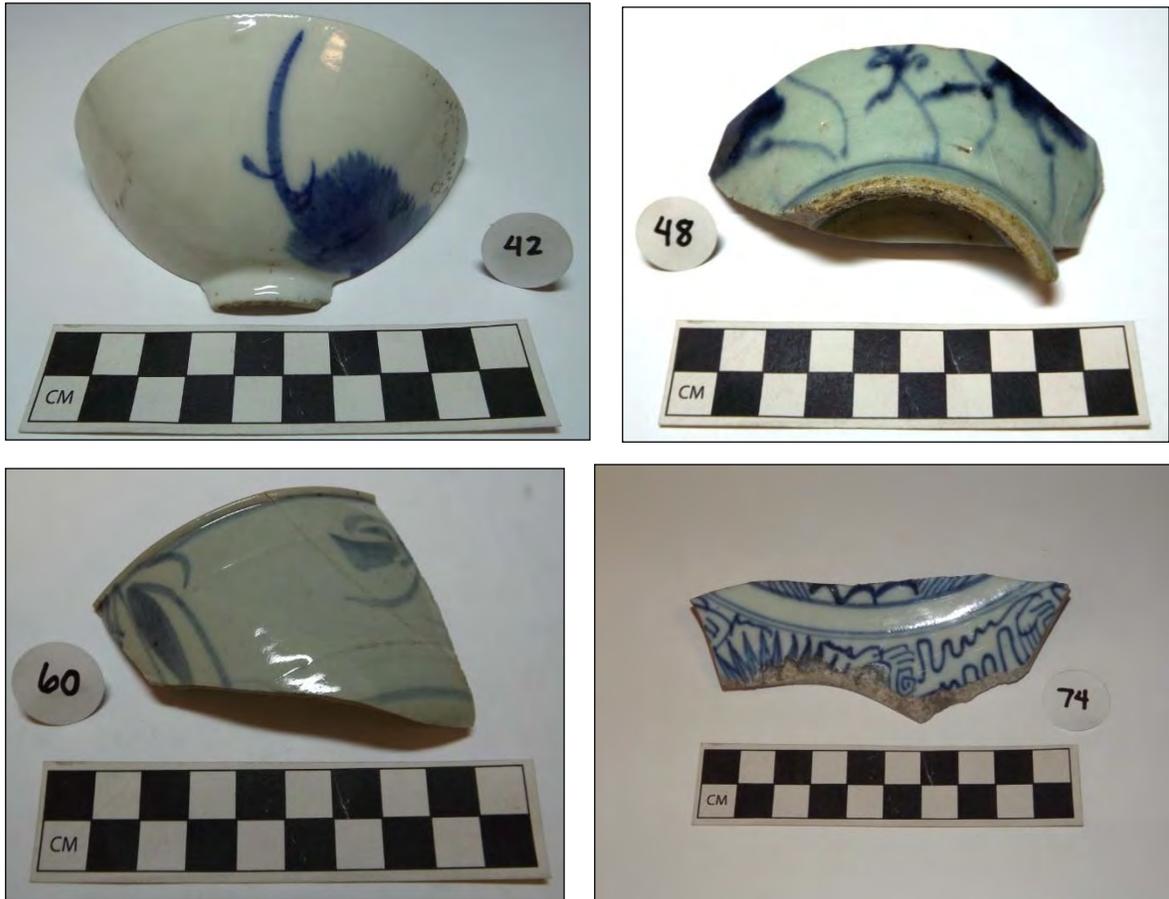


Figure 274. Japanese rice bowl fragment (Acc. # 42), Chinese rice bowl fragments (Acc. # 48 and 60) and Chinese dish fragment (Acc. # 74) collected from SIHP # -7579

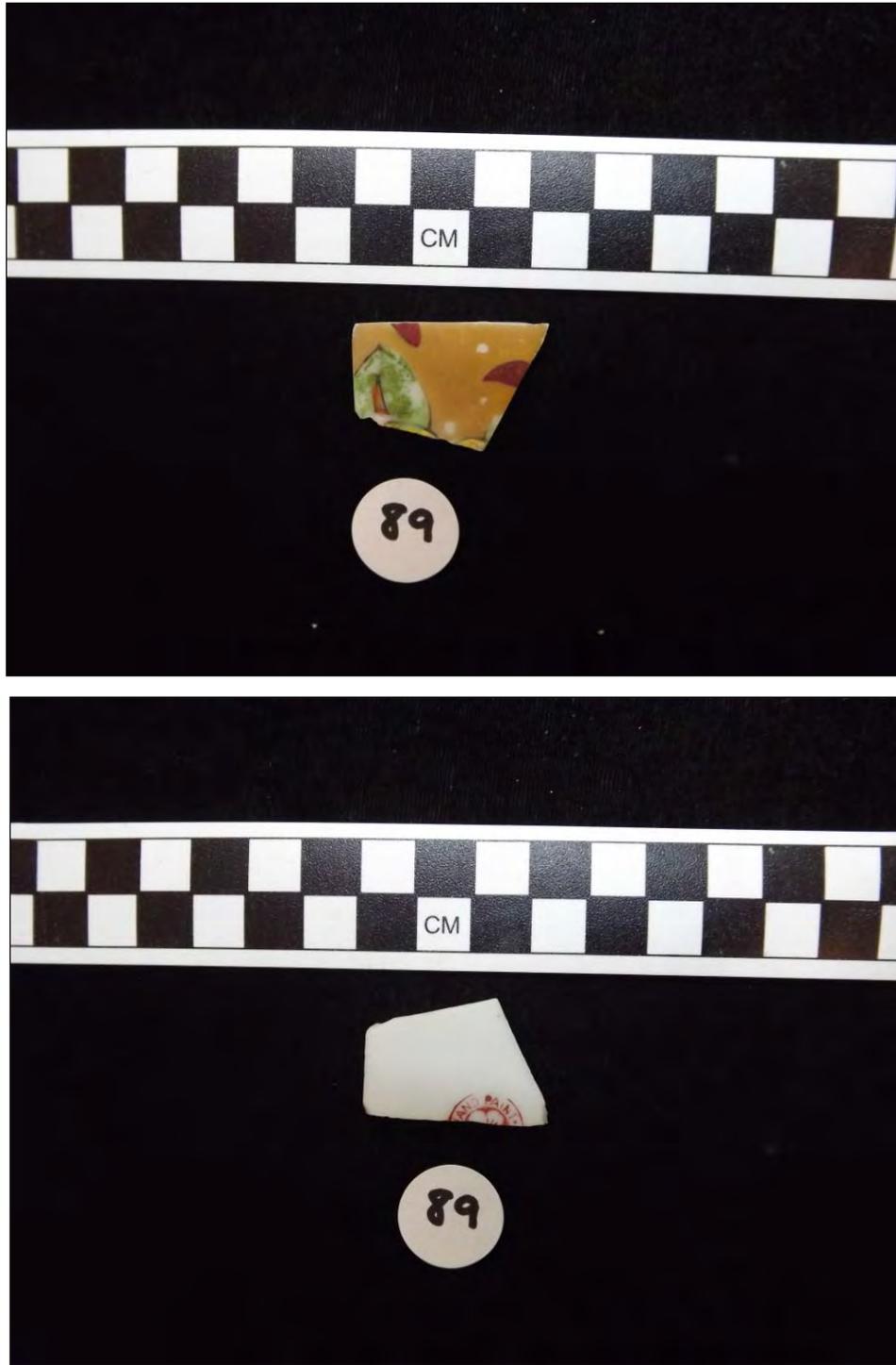


Figure 275. Chinese “Four Seasons” ceramic base fragment (Acc. # 89), interior (upper) with design and exterior (lower) with base stamp, collected from SIHP # -7578

Table 99. Summary of Artifacts by Provenience

SIHP #	T-#	Provenience	Artifact Types	Date Ranges	Specific Dates
7578	20	Fea. F	Two toy cars, one calendar, one cup	1930-1950	1948
7578	28	Fea. H	One milk bottle	1905-1940	
7578	40E	Fea. K	One button, one pencil, one vial, one handle, five milk bottles	1905-1940	
7578	48	Fea. L	One tile, two bottles	1915-1950s	1942
7578	49	Fea. N	Four bottles, one Chinese porcelain dish	1908-1950	post-1929, post-1940
7579	40G	Stra. IIIa	One Chinese dish, one Euro-American dish, one glass bead	19 <sup>th</sup> c.	
7579	40C	Stra. III	One Japanese rice bowl, one Chinese rice bowl, one chopstick fragment, one hair clip, two pipe stem fragments	early 19 <sup>th</sup> c. to 1911	1850-1911
7579	40B	Str. III	One Chinese rice bowl, four Euro-American tablewares, three clay pipe stems, one iron tube	early 19 <sup>th</sup> c. to late 19 <sup>th</sup> c.	1840-1880
7579	40D	Str. III	One German stoneware bottle, two Euro-American tablewares, one Chinese rice bowl	1840-1914	1840-1880
7579	40D	Str. IV	One clay pipe stem, one chert fragment	early to late 19 <sup>th</sup> c.	
7580	8	Str. IV, Sample Area 1	One glass bottle fragment	Post 1820	
7580	9	Str. IV	One basalt adze	Pre-Contact to early Post-Contact	
7580	9	Fea. B	Fire-cracked rock	Pre-Contact to early Post-Contact	
7580	37	Str. III, Sample Area 2	Fire-cracked rock, one olive green bottle, one yellowware fragment	1820-1890	1820-1890
7580	38	Str. II, Sample Area 1	Basalt debitage, fire-cracked rock, one glass bottle fragment, one clay pipe stem fragment	19 <sup>th</sup> c.	
7580	39	Str. III	Basalt debitage	Pre-Contact to early Post-Contact	
7580	39	Fea. F	Slag	19 <sup>th</sup> -20 <sup>th</sup> c.	
7580	39	Str. III, Sample Area 1	Imported chert, fire-cracked rock	Early 19 <sup>th</sup> c.	

SIHP #	T-#	Provenience	Artifact Types	Date Ranges	Specific Dates
7580	41	Str. IVa	Basalt sinker	Pre-Contact to early Post-Contact	
7580	43	Str. II, Sample Area 1	Fire-cracked rock	Pre-Contact to early Post-Contact	
7580	44	Str. III, Sample Area 1	Fire-cracked rock, copper nail, iron nail, Euro-American tableware	19 <sup>th</sup> c.	1840-1870
7580	45	Str. III, Sample Area 1	Fire-cracked rock; basalt debitage	Pre-Contact to early Post-Contact	
7580	45	Str. III, Sample Area 2	Fire-cracked rock	Pre-Contact to early Post-Contact	
7580	40C	Str. IV	Iron nail	19 <sup>th</sup> c.	
7580	40D	Str. IV	Bone awl	Pre-Contact to early Post-Contact	
7580	40D	Fea. K	Shell tool, calcium carbonate	Pre-Contact to early Post-Contact	
7580	40D	Str. IV	Basalt Core	Pre-Contact to early Post-Contact	
7580	40F	Fea. S	Basalt Flake	Pre-Contact to early Post-Contact	
7580	40G	Str. IV	Two Euro-American tablewares, one aku lure, one gaming chip, one glass bottle fragment	19 <sup>th</sup> to early 20 <sup>th</sup> c.	1840-1854; 1880-1920s

For SIHP # -7580, all of the artifacts were probably manufactured in the mid- to late- nineteenth century except a single bakelite chopstick that was made after 1909. Several of the tablewares can be dated from ca. 1840 to 1880. The deposit consists mainly of Euro-American and Asian tablewares and white clay pipe stems. No glass bottles were found in this deposit.

SIHP # -7579 was the only cultural layer that contained traditional Hawaiian artifacts in association with imported raw materials (e.g. chert) and finished items (e.g., nails, bottles, ceramics). All of the imported finished items likely date to the nineteenth century. None were types produced in the twentieth century.

#### 5.1.1.4 EDXRF Analysis

As mentioned above, five chert flakes (Acc. # 27) were collected from SIHP # -7580, a pre-Contact to post-Contact cultural layer. These flakes were provided to Dr. Peter Mills of the University of Hawai'i at Hilo for Energy-Dispersive X-Ray Fluorescence (EDXRF) analysis to determine their specific geologic sources. Dr. Mills established that none of the flakes are basalts; all of them are cherts or limestone/cherts. Dr. Mills provided the following discussion of possible sources of the flakes:

The high-grade tan/gray/brown smoky-translucent flakes are very typical of European gunflints and do not match any known cryptocrystalline silicate colors or textures from Hawaii that I know of. White to clear to yellowish colored cherts/chalcedony could be from local sources IF we could ever prove that the Waiahawahewa Gulch (mostly clear and white chalcedony) or Lualualei material (yellowish from what I have seen) were quarried. (personal communication with Dr. Peter Mills, November 25th 2013)

Dr. Mills also stated that all five chert flakes are spalls from either gunflints or strike-a-lights from the late eighteenth or nineteenth centuries.

#### 5.1.2 Traditional Hawaiian Artifacts

Traditional Hawaiian artifacts were only observed and collected from SIHP # -7580 (see Table 98). These consist of an adze fragment (Acc. # 2) (Figure 276), a basalt sinker (Acc. # 29) (Figure 277), a bone awl (Acc. # 39) (Figure 278), a marine shell gourd stopper (Acc. # 40) (Figure 279), a basalt core stone (Acc. # 41) (Figure 280), a calcium carbonate crystal manuport (Acc. # 63) (Figure 281), an *aku* lure preform (Acc.# 79), (Figure 282), and basalt debitage (flakes), as well as basalt fire-cracked rock.

In summary, the artifact assemblage observed at SIHP # -7580 indicates the site is associated with traditional land use, and includes fishing gear, a bone tool, stone tools, possibly used for cutting and/or wood-working, and tools used for storage.

## 5.2 Midden

Midden associated with pre-Contact to early post-Contact traditional Hawaiian land use was recovered during subsurface investigations conducted within the project area (Table 100). All of the collected midden remains came from SIHP # -7580, a subsurface cultural layer that developed on naturally deposited marine sand. The midden remains were collected from screened sediment samples collected from the cultural layer or from subsurface pit features associated with the cultural layer. Not all sediment from the SIHP # -7580 cultural layer and its associated features were screened and collected. Therefore, it is not possible to draw any definite conclusions regarding food consumption patterns based on the midden assemblage.

A total of 2,525.9 g of marine invertebrate midden remains were collected, consisting of 12.1 g of crab claw fragments, 4.6 g of sea urchin case or spine fragments, 2064 g of gastropod shell, and 3.4 g of unidentified gastropod/bivalve shell (see Table 100).

The gastropods are comprised of shells in the families Neritidae (1480.2 g), Strombidae (266.9), Turbinidae (174.2 g), Conidae (17.5 g), Cypraeidae (15.0 g), Hipponicidae (13.2 g), Cymatiidae

(12.8 g), Ranellidae (12.2), Naticidae (8.2), Pyramidellidae (5.3 g), Tonnidae (1.4 g), and Nassiariidae (1.3). All of the shells of the family Neritidae are identified as *Nerita picea*, the pipipi, one of the most favored of Hawaiian gastropod food selections. This species, which dominates the gastropod collection (71%) is found on rocky shorelines, usually above the high tide line in the supralittoral zone, which is the area “above the upper limit of waves and tides” (Kay 1979:7). In the eulittoral zone, the area between the tide level and the upper reaches of waves, are found many of the most common species of Cypraeidae, Conidae, and Hipponicidae on basalt shorelines, solution benches, and fringing reefs. Species of the genus Naticidae are also found in the eulittoral zone on sandy beaches. In the sublittoral zone, where shells are constantly below the surface of the water, several species of the Cypraeidae, Nassiariidae, and Conidae are found. In deeper waters (greater than 3 m) of the sublittoral zone, shells of the Tonnidae and Cymatiidae can be found (Kay 1979:7-12, 233). All of these shellfish could have been collected for food, although the smaller species, such as Hipponicidae, Ranellidae, and Pyramidellidae could have been collected clinging to vegetation, such as limu (edible seaweed), instead of being purposefully collected. However, Titcomb (1978:338) has noted that the Hawaiians collected almost all kinds of shellfish. The meat from smaller shellfish could be combined and boiled together.

The bivalves are comprised of 0.9 g of unidentified bivalve shell, and shells in the families Tellinidae (64.0 g), Isognomonidae (50.5 g), Mytilidae (13.6 g), Pteriidae (11.3 g), and Lucinidae (*Ctena bella*) (5.5 g). Bivalves of the first four families were collected by Hawaiians for food, and the shells with mother-of-pearl interiors in the Isognomonidae and Pteriidae families, were collected to make fish hooks and lures. Artifact No. 79, an aku fish lure, is likely made of the mother-of-pearl from one of these families. The most common species of the family Tellinidae are found on sand inshore of fringing reefs in depths of 2 to 3 meters in the eulittoral zone (Kay 1979:563). The Isognomonidae are found in tide pools and fringing reefs in the eulittoral zone (Kay 1979:520). The Mytilidae are usually found at the 0 m tide mark and in shallow water on solution benches in the eulittoral zone (Kay 1979:511) The Pteriidae are found in shallow water in the eulittoral zone, and juveniles can be found in tide pools (Kay 1979:518). *Ctena bella* is a small bivalve, ubiquitous in shallow water and in sand patches (Kay 1979:543), which may have become part of the sand deposit naturally.

A total of 52.6 g of fish bone was collected, consisting of Puffer fish (Tetraodontidae) (45.0 g), parrotfish (Scaridae) (3.6 g), and unidentified fish bones fragments (4.0 g). A sample from SIHP # -7580, Feature A yielded 42.7 g (95%) of the puffer fish bones. It is likely that these bones found represent a single one fish, as the puffer fish contains numerous dermal spines. Titcomb (1972:131) says that the Hawaiians rarely ate puffer fish flesh because of the poison found in the gall bladder, but Malo (1951:45) said that the flesh was edible. The fish are usually found in estuaries (Titcomb 1979:132). Fish of the Sparidae families, found along reefs (Titcomb 1972:147) were also favorite foods.

A total of 74.5 g of faunal bone was collected, consisting of dog (*Canis familiaris*) teeth (4.4 g), pig (*Sus scrofa*) bones and teeth (8.1 g), a sea turtle (*Chelonioidea sp.*) bone (1.6 g), and unidentified bone (60.4 g). Of the unidentified bone, 9.7 g were burnt. The dog and pig could be food remains from the pre- or post-Contact periods or the remains of animals that dies naturally. A hole was often bored into dog teeth, which were strung to make anklets (Titcomb 1969:16).

There were no bored holes in the teeth from the Block I collection. Sea turtles were used for food and their shells were used to make ornaments and tools (Malo 1951:47).

In addition to the animal remains, 2.0 g of *kukui* nut shell fragments were collected. These could be food items, as the nut meat was used as a relish, or they could be the remains of nuts collected to make oil lamps.

In summary, the midden remains consist of species of marine and terrestrial animals that were traditionally collected for food by Hawaiians and continued to be used for food into the post-contact period, and for some species, into the present. The marine species were mainly collected from the shore (supralittoral) and near-shore (eulittoral) zones. Traditionally, the gathering of shellfish, crabs, sea urchins, and *limu* (seaweed) was women's work (Titcomb 1978:327), but some of the larger fish, such as the parrotfish, may have been caught by fishermen in nets or traps or hook-and-line fishing gear.

### 5.3 Wood Taxa Identification

Wood taxa identification of charcoal samples collected from SIHP # -7580 was conducted to determine the vegetation that may have been present in coastal Kaka'ako prior to Contact and modern development, and to potentially identify some of the types of plant material that was transported to, and utilized at, the site. The ability to confirm the presence of plant species commonly associated with traditional Hawaiian use provides insight into some activities that may have been associated with this subsurface cultural layer.



Figure 276. Adze fragment (Acc. # 2), collected from SIHP # -7580

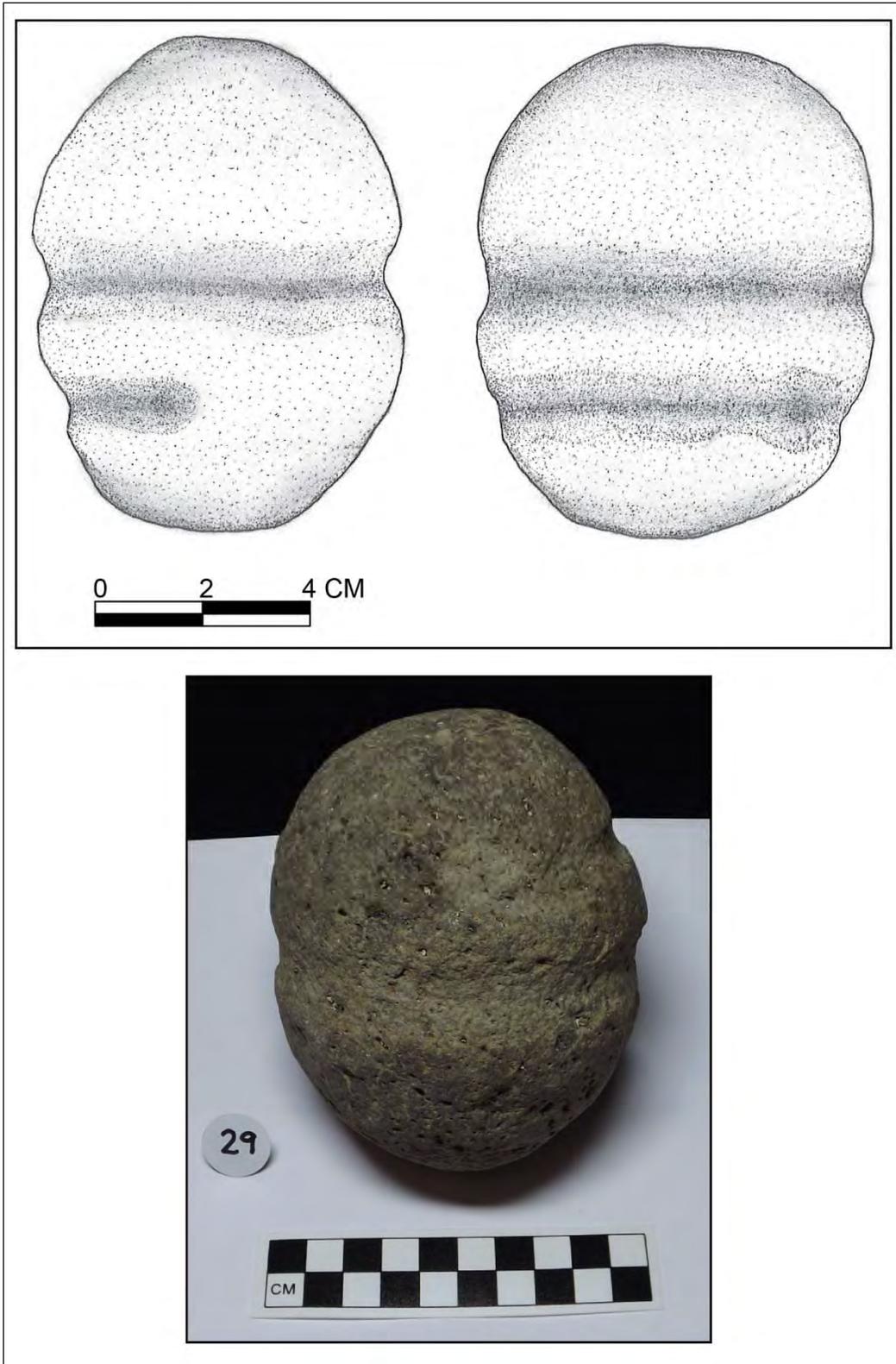


Figure 277. Basalt sinker (Acc. # 29), collected from SIHP # -7580



Figure 278. Bone awl (Acc. # 39), collected from SIHP # -7580



Figure 279. Marine shell gourd stopper (Acc. # 40), collected from SIHP # -7580



Figure 280. Basalt core stone (Acc. # 41), collected from SIHP # -7580



Figure 281. Calcium carbonate crystal manuport (Acc. # 63), collected from SIHP # -7580



Figure 282. *Aku* lure preform (Acc. # 79), collected from SIHP # -7580

Table 100. Midden Remains Collected from SIHP # 50-80-14-7580, Subsurface Cultural Layer

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
8	Fea. A	130-170	>100	42.7	Fish bones	Puffer fish (Tetraodontidae) spines			
8	Str. IV Sample Area 1	110-140	7	9.3	Faunal bone	Unidentified bone fragments			
8	Str. IV Sample Area 1	110-140	5	2.6	Shell	<i>Pipipi</i> (Neritidae)			
8	Str. IV Sample Area 1	110-140		7.7	Shell	Strombidae			
8	Str. IV Sample Area 1	110-140	1	0.4	Shell	Hipponicidae			
8	Str. IV Sample Area 1	110-140	1	0.3	Shell	<i>Ctena bella</i>			
8	Str. IV Sample Area 1	110-140	1	0.4	Shell	Mytilidae			
8	Str. IV Sample Area 1	110-140	1	1.6	Shell	Cowrie (Cypridae)			
8	Str. IV Sample Area 1	110-140	1	0.4	Shell	Urchin (Echinoidea) spines			
8	Str. IV Sample Area 1	110-140	3	1.5	Shell	Unidentified shell fragments	<b>14.9</b>	<b>42.7</b>	<b>9.3</b>
9	Fea. B	110-140	4	2.1	Faunal bone	Pig bone fragments ( <i>Sus scrofa</i> )			
9	Fea. B	110-140	8	5.5	Shell	<i>Pipipi</i> (Neritidae)			
9	Fea. B	110-140	1	0.2	Shell	Urchin (Echinoidea) shell fragments			
9	Fea. B	110-140	1	1.8	Shell	Naticidae			
9	Fea. B	110-140	20	55.8	Shell	Strombidae			
9	Fea. B	110-140	1	9.1	Shell	Triton			
9	Fea. B	110-140	4	1.9	Shell	Unidentified mollusk			
9	Fea. B	110-140	20	22.1	Shell	Strombidae	<b>96.4</b>		<b>2.1</b>
37	Str. III Sample Area 1	90-100	7	30.5	Faunal bone	Possible pig ( <i>Sus scrofa</i> )/dog bones ( <i>Canis familiaris</i> )			
37	Str. III Sample Area 1	90-100	3	3.9	Faunal bone	Dog teeth ( <i>Canis familiaris</i> )			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
37	Str. III Sample Area 1	90-100	14	1.4	Fish bones	Puffer fish spines			
37	Str. III Sample Area 1	90-100	182	85.8	Shell	<i>Pipipi</i> (Neritidae)			
37	Str. III Sample Area 1	90-100	11	12.1	Shell	Strombidae			
37	Str. III Sample Area 1	90-100	6	1.5	Shell	Mytilidae			
37	Str. III Sample Area 1	90-100	2	2.4	Shell	Cowrie (Cypridae)			
37	Str. III Sample Area 1	90-100	7	5.6	Shell	Tellinidae			
37	Str. III Sample Area 1	90-100	6	1.5	Shell	Crab (Brachyura) claw fragments			
37	Str. III Sample Area 1	90-100	1	1.3	Shell	Turbinidae			
37	Str. III Sample Area 1	90-100	2	0.9	Shell	Pteriidae	<b>111.1</b>	<b>1.4</b>	<b>34.4</b>
38	Str. II Sample Area 1	74-110	129	101.5	Shell	<i>Pipipi</i> (Neritidae)			
38	Str. II Sample Area 1	74-110	6	12.6	Shell	Turbinidae			
38	Str. II Sample Area 1	74-110	3	4	Shell	Cowrie ( <i>Cypraeidae</i> )			
38	Str. II Sample Area 1	74-110	1	0.7	Shell	Tellinidae			
38	Str. II Sample Area 1	74-110	14	15.8	Shell	Strombidae			
38	Str. II Sample Area 1	74-110	209	151.5	Shell	<i>Pipipi</i> (Neritidae)			
38	Str. II Sample Area 1	74-110	1	0.2	Fish bones	Puffer fish (Tetraodontidae) spines			
38	Str. II Sample Area 1	74-110	1	0.2	Shell	<i>Ctena bella</i>			
38	Str. II Sample Area 1	74-110	3	3.7	Shell	Tellinidae			
38	Str. II Sample Area 1	74-110	12	3.4	Shell	Mytilidae			
38	Str. II Sample Area 1	74-110	1	0.1	Fish bones	Fish bone fragments			
38	Str. II Sample Area 1	74-110	4	0.6	Shell	Urchin (Echinoidea) spines and shell fragments			
38	Str. II Sample Area 1	74-110	7	8.1	Shell	Tellinidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
38	Str. II Sample Area 1	74-110	3	0.8	Shell	Unidentified bivalve fragments			
38	Str. II Sample Area 1	74-110	6	1.8	Shell	Crab (Brachyura) claw fragments			
38	Str. II Sample Area 1	74-110	1	1.1	Shell	Cowrie (Cypridae)			
38	Str. II Sample Area 1	74-110	7	2.8	Shell	Strombidae			
38	Str. II Sample Area 1	74-110	3	2.52	Shell	Pyrimidelladae			
38	Str. II Sample Area 1	74-110	4	0.6	Shell	Hipponicidae			
38	Str. II Sample Area 1	74-110	5	11.7	Shell	Turbinidae	<b>323.42</b>	<b>0.3</b>	
39	Str. II	50-70	1	0.2	Shell	Hipponicidae			
39	Str. II	50-70	2	1.4	Shell	<i>Ctena bella</i>			
39	Str. II	50-70	14	5.5	Shell	<i>Pipipi</i> (Neritidae)			
39	Str. II	50-70	2	0.8	Shell	Strombidae			
39	Str. II	50-70	2	0.8	Shell	Turbinidae			
39	Str. II	50-70	4	0.3	Shell	Mytilidae			
39	Str. II	50-70	3	0.7	Shell	Crab (Brachyura) claw fragments			
39	Str. II	50-70	123	53.8	Shell	<i>Pipipi</i> (Neritidae)	<b>63.5</b>		
39	Fea. F	85-115	1	0.4	Faunal bone	Unidentified bone fragments			
39	Fea. F	85-115	2	0.1	Fish bones	Puffer fish (Tetraodontidae) spines			
39	Fea. F	85-115	6	1.1	Shell	Crab (Brachyura) claw fragments			
39	Fea. F	85-115	2	0.9	Shell	Pyrimidelladae			
39	Fea. F	85-115	8	0.8	Shell	Hipponicidae			
39	Fea. F	85-115	8	1.6	Shell	Mytilidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
39	Fea. F	85-115	33	18.8	Shell	Strombidae			
39	Fea. F	85-115	3	0.7	Shell	<i>Ctena bella</i>			
39	Fea. F	85-115	10	17.8	Shell	Tellinidae			
39	Fea. F	85-115	156	85.7	Shell	<i>Pipipi</i> (Neritidae)			
39	Fea. F	85-115	8	14.2	Shell	Strombidae			
39	Fea. F	85-115	1	0.2	Shell	Pyrimidelladae			
39	Fea. F	85-115	2	1.5	Shell	Hipponicidae			
39	Fea. F	85-115	5	1.5	Shell	Pteriidae			
39	Fea. F	85-115	1	1.3	Shell	Naticidae			
39	Fea. F	85-115	2	0.8	Shell	Isognomonidae			
39	Fea. F	85-115	2	1.9	Shell	Tellinidae			
39	Fea. F	85-115	2	1.8	Shell	Cowrie (Cypridae)			
39	Fea. F	85-115	1	0.1	Shell	Mytilidae			
39	Fea. F	85-115	8	0.6	Fish bones	Fish bone fragments	<b>214.2</b>	<b>0.7</b>	<b>0.4</b>
43	Str. II Sample Area 1	80-90	216	104.8	Shell	<i>Pipipi</i> (Neritidae)			
43	Str. II Sample Area 1	80-90	3	10	Shell	Turbinidae			
43	Str. II Sample Area 1	80-90	6	5.4	Shell	Strombidae			
43	Str. II Sample Area 1	80-90	4	0.6	Shell	Crab (Brachyura) claw fragments			
43	Str. II Sample Area 1	80-90	1	1.7	Shell	Pyrimidelladae			
43	Str. II Sample Area 1	80-90	4	5.9	Shell	Tellinidae			
43	Str. II Sample Area 1	80-90	10	4.2	Shell	Pteriidae			
43	Str. II Sample Area 1	80-90	9	1.3	Shell	Mytilidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
43	Str. II Sample Area 1	80-90	1	0.2	Shell	Urchin (Echinoidea) shell fragments			
43	Str. II Sample Area 1	80-90	1	0.1	Shell	Hipponicidae	<b>134.2</b>		
44	Str. II Sample Area 1	90-120	22	10.5	Shell	<i>Pipipi</i> (Neritidae)			
44	Str. II Sample Area 1	90-120	6	9	Shell	Strombidae	<b>19.5</b>		
45	Str. IV Sample Area 1	80-120	244	127.4	Shell	<i>Pipipi</i> (Neritidae)			
45	Str. IV Sample Area 1	80-120	1	0.6	Shell	Crab (Brachyura) claw fragments			
45	Str. IV Sample Area 1	80-120	2	0.1	Shell	Mytilidae			
45	Str. IV Sample Area 1	80-120	1	0.5	Shell	Tellinidae			
45	Str. IV Sample Area 1	80-120	3	0.4	Shell	Hipponicidae			
45	Str. IV Sample Area 1	80-120	7	1.7	Shell	Pteriidae			
45	Str. IV Sample Area 1	80-120	1	3.7	Shell	Triton			
45	Str. IV Sample Area 1	80-120	2	0.8	Shell	<i>Ctena bella</i>			
45	Str. IV Sample Area 1	80-120	3	3.8	Shell	Strombidae			
45	Str. IV Sample Area 1	80-120	3	2.2	Shell	Turbinidae			
45	Str. IV Sample Area 1	80-120	1	0.1	Shell	Urchin (Echinoidea) spines	<b>141.3</b>		
45	Str. IV Sample Area 2	80-100	378	141.8	Shell	<i>Pipipi</i> (Neritidae)			
45	Str. IV Sample Area 2	80-100	16	57	Shell	Turbinidae			
45	Str. IV Sample Area 2	80-100	2	16	Shell	Conidae			
45	Str. IV Sample Area 2	80-100	1	2.7	Shell	Cowrie ( <i>Cypraeidae</i> )			
45	Str. IV Sample Area 2	80-100	6	3	Shell	Pteriidae			
45	Str. IV Sample Area 2	80-100	8	0.5	Shell	Urchin (Echinoidea) spines			
45	Str. IV Sample Area 2	80-100	9	1.3	Shell	Mytilidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
45	Str. IV Sample Area 2	80-100	4	6.1	Shell	Isognomonidae			
45	Str. IV Sample Area 2	80-100	2	1.3	Shell	Tellinidae			
45	Str. IV Sample Area 2	80-100	3	0.5	Shell	<i>Ctena bella</i>			
45	Str. IV Sample Area 2	80-100	9	9.2	Shell	Strombidae			
45	Str. IV Sample Area 2	80-100	5	0.4	Fish bones	Fish bone fragments			
45	Str. IV Sample Area 2	80-100	9	2.7	Faunal bone	Unidentified bone fragments			
45	Str. IV Sample Area 2	80-100	8	0.9	Shell	Crab (Brachyura) claw fragments	<b>239.4</b>	<b>0.4</b>	<b>2.7</b>
40D	Fea. K	80-120		181.3	Shell	<i>Pipipi</i> (Neritidae)			
40D	Fea. K	80-120		23.1	Shell	Isognomonidae			
40D	Fea. K	80-120		54	Shell	Turbinidae			
40D	Fea. K	80-120		9.4	Shell	Strombidae			
40D	Fea. K	80-120		3.4	Shell	Hipponicidae			
40D	Fea. K	80-120		0.3	Shell	Mytilidae			
40D	Fea. K	80-120		1.2	Shell	Tellinidae			
40D	Fea. K	80-120		4	Shell	Conidae			
40D	Fea. K	80-120		1.3	Shell	Nassariidae			
40D	Fea. K	80-120		4.4	Shell	Ranellidae			
40D	Fea. K	80-120		1.6	Shell	Naticidae			
40D	Fea. K	80-120		0.1	Fish bones	Fish bone fragments			
40D	Fea. K	80-120		0.1	Plant	<i>Kukui</i> nut shell fragments			
40D	Fea. K	80-120		0.8	Shell	Urchin (Echinoidea) shell fragments			
40D	Fea. K	80-120		0.7	Shell	Crab (Brachyura) claw fragments	<b>285.5</b>	<b>0.1</b>	

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
40D	Fea. I	90-100		15.6	Shell	<i>Pipipi</i> (Neritidae)			
40D	Fea. I	90-100		1.5	Shell	Turbinidae			
40D	Fea. I	90-100		4.6	Shell	Ranellidae			
40D	Fea. I	90-100		0.6	Shell	Strombidae			
40D	Fea. I	90-100		7.4	Shell	Conidae			
40D	Fea. I	90-100		2.2	Shell	Tellinidae			
40D	Fea. I	90-100		0.1	Shell	Urchin (Echinoidea) shell fragments			
40D	Fea. I	90-100		16.3	Shell	<i>Pipipi</i> (Neritidae)			
40D	Fea. I	90-100		0.7	Shell	Turbinidae			
40D	Fea. I	90-100		0.3	Shell	Urchin (Echinoidea) shell fragments			
40D	Fea. I	90-100		0.8	Shell	Conidae			
40D	Fea. I	90-100		0.5	Shell	Hipponicidae	<b>284.5</b>	<b>0.1</b>	
40B	Str. IV, Subfeature 11	90-115		11.9	Shell	<i>Pipipi</i> (Neritidae)			
40B	Str. IV, Subfeature 11	90-115		5	Shell	Strombidae	<b>16.9</b>		
40A	Fea. G	70-105		104.8	Shell	<i>Pipipi</i> (Neritidae)			
40A	Fea. G	70-105		1.2	Shell	Isognomonidae			
40A	Fea. G	70-105		6.9	Shell	Strombidae			
40A	Fea. G	70-105		3	Shell	Tellinidae			
40A	Fea. G	70-105		1.4	Shell	Cowrie (Cypridae)			
40A	Fea. G	70-105		0.9	Shell	Hipponicidae			
40A	Fea. G	70-105		0.1	Fish bones	Fish bone fragments			
40A	Fea. G	70-105		1.3	Shell	Naticidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
40A	Fea. G	70-105		0.1	Shell	Urchin (Echinoidea) shell fragments	<b>118.3</b>	<b>0.1</b>	
40E	Str. IV	70-100		4.7	Shell	<i>Pipipi</i> (Neritidae)			
40E	Str. IV	70-100		0.2	Shell	Isognomonidae			
40E	Str. IV	70-100		1.8	Shell	Strombidae			
40E	Str. IV	70-100		0.5	Shell	Hipponicidae			
40E	Str. IV	70-100		0.1	Shell	Mytilidae			
40E	Str. IV	70-100		0.1	Shell	<i>Ctena bella</i>	<b>7.4</b>		
40E	Str. IV	70-100		12	Shell	Strombidae			
40E	Str. IV	70-100		8.7	Shell	Turbinidae			
40E	Str. IV	70-100		0.3	Shell	Urchin (Echinoidea) shell fragments			
40E	Str. IV	70-100		1.7	Shell	Tellinidae			
40E	Str. IV	70-100		0.6	Shell	Mytilidae			
40E	Str. IV	70-100		0.9	Shell	Isognomonidae			
40E	Str. IV	70-100		0.7	Fish bones	Unidentified fish bones			
40E	Str. IV	70-100		2.2	Shell	Naticidae			
40E	Str. IV	70-100		0.5	Shell	Hipponicidae			
40E	Str. IV	70-100		0.2	Shell	<i>Ctena bella</i>			
40E	Str. IV	70-100		0.5	Shell	Crab (Brachyura) claw fragments			
40E	Str. IV	70-100		69.6	Shell	<i>Pipipi</i> (Neritidae)	<b>97.2</b>	<b>0.7</b>	
40E	Str. IV	70-100		41.8	Shell	<i>Pipipi</i> (Neritidae)			
40E	Str. IV	70-100		8.6	Shell	Turbinidae			
40E	Str. IV	70-100		2.9	Shell	Isognomonidae			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
40E	Str. IV	70-100		7.3	Shell	Tellinidae			
40E	Str. IV	70-100		6.9	Shell	Conidae			
40E	Str. IV	70-100		1.5	Shell	Mytilidae			
40E	Str. IV	70-100		2.6	Shell	Hipponicidae			
40E	Str. IV	70-100		3.7	Shell	Crab (Brachyura) claw fragments			
40E	Str. IV	70-100		47.5	Shell	Strombidae			
40E	Str. IV	70-100		3.2	Shell	Ranellidae			
40E	Str. IV	70-100		0.4	Shell	Urchin (Echinoidea) shell fragments			
40E	Str. IV	70-100		0.4	Plant	<i>Kukui</i> nut shell fragments			
40E	Str. IV	70-100		1.8	Fish bones	Unidentified fish bones			
40E	Str. IV	70-100		1.8	Faunal bone	Burnt mammal bone	<b>126.4</b>	<b>1.8</b>	<b>1.8</b>
40F	Fea. Q	70-90		1.5	Plant	<i>Kukui</i> nut shell fragments			
40F	Fea. Q	70-90		4.8	Shell	Turbinidae			
40F	Fea. Q	70-90		9.7	Shell	Strombidae			
40F	Fea. Q	70-90		0.6	Shell	Mytilidae			
40F	Fea. Q	70-90		1.1	Shell	<i>Ctena bella</i>			
40F	Fea. Q	70-90		1	Shell	Isognomonidae			
40F	Fea. Q	70-90		0.6	Shell	Hipponicidae			
40F	Fea. Q	70-90		2	Shell	<i>Pipipi</i> (Neritidae)			
40F	Fea. Q	70-90		29.1	Shell	Conidae	48.9		
40F	Fea. S	75-105		0.5	Faunal bone	Dog teeth ( <i>Canis familiaris</i> )			
40F	Fea. S	75-105		7.9	Faunal bone	Unidentified burnt mammal bone			

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
40F	Fea. S	75-105		42	Shell	<i>Pipipi</i> (Neritidae)			
40F	Fea. S	75-105		6.5	Shell	Strombidae			
40F	Fea. S	75-105		0.5	Shell	Mytilidae			
40F	Fea. S	75-105		0.2	Shell	<i>Ctena bella</i>			
40F	Fea. S	75-105		0.2	Shell	Hipponicidae			
40F	Fea. S	75-105		0.3	Shell	Turbinidae			
40F	Fea. S	75-105		0.1	Fish bones	Unidentified fish bones	<b>49.7</b>	<b>0.1</b>	<b>8.4</b>
40G	Str. IV	60-115		7.8	Faunal bone	Unidentified mammal bone			
40G	Str. IV	60-115		1.6	Faunal bone	Turtle bones ( <i>Chelonioidea</i> sp.)			
40G	Str. IV	60-115		6	Faunal bone	Pig teeth ( <i>Sus scrofa</i> )			
40G	Str. IV	60-115		1.1	Shell	Isognomonidae			
40G	Str. IV	60-115		2.8	Fish bones	Parrot fish (Scaridae) beak			
40G	Fea. W	80-105		3.1	Shell	Tellinidae			
40G	Fea. W	80-105		0.6	Shell	Urchin (Echinoidea) shell fragments			
40G	Fea. W	80-105		75.6	Shell	<i>Pipipi</i> (Neritidae)			
40G	Fea. W	80-105		10	Shell	Isognomonidae			
40G	Fea. W	80-105		0.1	Fish bones	Fish bone fragments			
40G	Fea. V	80-100		1.4	Shell	<i>Tonna perdix</i>			
40G	Fea. V	80-100		0.6	Fish bones	Puffer fish (Tetraodontidae) mouth piece			
40G	Fea. V	80-100		0.8	Fish bones	Parrot ( <i>Scaridae</i> ) fish beak			
40G	Fea. V	80-100		38.2	Shell	<i>Pipipi</i> (Neritidae)			
40G	Fea. V	80-100		3.2	Shell	Isognomonidae	<b>133.2</b>	<b>4.3</b>	<b>15.4</b>

Trench #	Stratum/Feature	Depth (cmbs)	# of Pieces	Weight (g)	Material Type	Comments	Shell Midden Total (g)	Fish Bone Total (g)	Faunal Bone Total (g)
<b>Grand Total:</b>							<b>2525.9</b>	<b>52.7</b>	<b>74.5</b>

Six charcoal samples collected from SIHP # -7580 were submitted to IARII for wood taxa identification (Table 101; Murakami 2013; see Appendix B). The identified wood taxa were classified into three categories, native species, Polynesian-introduced species, and alien species.

### 5.3.1 Native Species

Identified native species are *Arecaceae* (palm family), *Chenopodium oahuense* ('āhehehe, 'āweoweo), *Diospyros sandwicensis* (*lama*), *Dodonaea viscosa* ('a 'ali 'i), *Hibiscus tiliaceus* (*hau*), *Metrosideros polymorpha* ('ōhi 'a lehua), *Myrsine lanaiensis* (*kōlea*), and *Psychotria* sp. (*kōpiko*).

The native species primarily consist of plants utilized for food, dyes, utensils, tools, fishnet floats, cordage, ropes, tapa for clothing, and fire wood. Of note was the presence of *lama*, a hardwood used for enclosures for specific idols and as a building material in traditional Hawaiian houses and temples.

### 5.3.2 Polynesian-Introduced Species

Identified Polynesian-introduced species are *Aleurites moluccana* (*kukui*) and *Syzygium* sp. (mountain apple, roseapple, Java plum, 'ōhi 'a ai).

*Kukui* was used for many purposes such as fire light, net floaters, and dugout canoes, as well as food. The *Syzygium* sp. wood was utilized for purposes ranging from housing posts, temple enclosures, carved idols, to dyes.

### 5.3.3 Alien Species

Identified alien species are *Pinaceae* (pine), *Pseudotsuga menziesii* (Douglas fir), *Leucaena leucocephala* (*koa haole*), and other unidentified hard wood species.

The alien species consist entirely of post-Contact introductions with a majority of the species being potentially utilized as lumber or as building materials for boxes, crates, furniture, ships, etc.

### 5.3.4 Summary

In summary, wood taxa identification of charcoal samples collected from SIHP # -7580 documented the presence of numerous native and Polynesian-introduced species, as well as post-Contact alien species introductions. Ethnobotanical research indicates all of the identified plant species present within the cultural layer had the potential to have been utilized by Hawaiians and foreigners. Based on wood taxa identification, possible activities conducted in association with this cultural layer include fishing, food preparation, tool and clothing manufacture, and house and canoe construction (Murakami 2012:1-3).

Table 101. Wood Taxa Identification from Charcoal Samples Collected at SIHP # 50-80-14-7580 (Adapted from Murakami 2013:2)

Provenience	Sample ID #	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Weight (g)
1: TE-9, Fea. B, 110-140 cmbs	1336-1	Not identified			Bark	0.60
	1336-2	Unknown 1			Stem	2.76
	1336-3	cf. <i>Psychotria</i> sp.	<i>Kōpiko</i>	Native/shrub-tree	Wood	1.16
	1336-4, 7	cf. <i>Metrosideros polymorpha</i>	' <i>Ōhi'a lehua</i>	Native/tree	Wood	4.77
	1336-5	<i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian introduction/tree	Nutshell	2.38
	1336-6	Unknown 2			Wood	0.54
	1336-8	<i>Diospyros sandwicensis</i>	<i>Lama</i>	Native/tree	Wood	0.43
	1336-9	Arecaceae	Palm	—/tree	cf. Petiole	0.06
	1336-10	cf. <i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian introduction/tree	Wood	0.20
	1336-11	cf. <i>Dodonaea viscosa</i>	' <i>A'ali'i</i>	Native/shrub	Wood	0.08
	1336-12	cf. Arecaceae	Palm	—/tree	Steles	0.07
	1336-13	cf. <i>Pseudotsuga menziesii</i>	Douglas fir	Alien/tree	Wood	0.05
	1336-14	Unknown 3			Wood	0.14
	2: TE-44, Stratum III, Sample Area 1, 90-120 cmbs	1336-15	Unknown 4			Wood
1336-16		Unknown 5, cf. temperate hardwood		Alien/tree	Wood	1.02
1336-17		cf. <i>Metrosideros polymorpha</i>	' <i>Ōhi'a lehua</i>	Native/tree	Wood	0.81
1336-18		Unknown 6, cf. temperate hardwood		Alien/tree	Wood	0.39
1336-19		cf. <i>Leucaena leucocephala</i>	<i>Koa haole</i>	Historic introduction/shrub-tree	Wood	0.49
1336-20		cf. Pinaceae	Pine	Alien/tree	Wood	0.88
3: TE-40E, Fea. O, 80-90 cmbs	1336-21	Unknown 7			Wood	2.62

Provenience	Sample ID #	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Weight (g)
4: TE-08, Fea. A, 130-165 cmbs	1336-22	Unknown 8			Wood	0.04
	1336-23	Unknown 3			Wood	0.04
	1336-24	<i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian introduction/tree	Nutshell	0.48
5: TE-40D, Fea. K, 110-120 cmbs	1336-32	<i>Hibiscus tiliaceus</i>	<i>Hau</i>	Native/shrub-tree	Wood	13.74
6: TE-40D, Stratum IV, 80-90 cmbs	1336-25	Unknown 9			Wood	2.83
	1336-26	Unknown 10			Wood	6.65
	1336-27	Unknown 11			Wood	0.83
	1336-28	cf. <i>Syzygium</i> sp.	Mountain apple, roseapple, Java plum, 'ōhi 'a ai	Native + historic introductions/tree	Wood	0.20
	1336-29		'Āheahea	Native/shrub	Wood	0.11
	1336-30	Unknown 3			Wood	0.54
	1336-31	cf. <i>Myrsine lanaiensis</i>	<i>Kōlea</i>	Native/tree	Wood	2.66

## 5.4 Radiocarbon Analysis

Five charcoal samples collected from the SIHP # -7580 cultural layer were sent to Beta Analytic, Inc. for radiocarbon dating utilizing the accelerator mass spectrometry (AMS) method in order to date this habitation layer. Dating results are shown in Table 102 (see also Appendix C).

The results for the five samples submitted for radiocarbon dating analysis are shown in Figure 283 through Figure 287. The first sample (Beta-368383) was collected from Test Excavation 9 (SIHP # -7580, Feature B) and yielded three possible date ranges, with a calibrated 2-sigma date of AD 1802-1938 (65.5 %) being the most probable. The second sample (Beta-368384) was collected from Test Excavation 40E (SIHP # -7580, Feature O) and yielded two possible date ranges, with a calibrated 2-sigma date range of AD 1805-1935 (68.3 %) being the most probable. The third sample (Beta-368385) was collected from Test Excavation 8 (SIHP # -7580, Feature A) and yielded two possible date ranges, with a calibrated 2-sigma date range of AD 1811-1920 (72.3 %) being the most probable. The fourth sample (Beta-368386) was collected from the cultural layer (SIHP # -7580) at Test Excavation 40D and yielded two possible date ranges, with a calibrated 2-sigma date range of AD 1807-1928 (69.1 %) being the most probable. The fifth sample (Beta-368387) was collected from Test Excavation 40D (SIHP # -7580, Feature K) and yielded two possible date ranges, with a calibrated 2-sigma date range of AD 1489-1604 (69.6 %) being the most probable.

Radiocarbon dating analysis on these five samples indicate late pre-Contact to nineteenth century dates for all samples except SIHP # -7580, Feature K which provided the only pre-Contact date.

Table 102. Results of Radiocarbon Analysis of Charcoal Collected from SIHP # 50-80-14-7580

CSH ID #	Beta Analytic ID #	Sample Material / Analytic Technique	Provenience	Conventional Radiocarbon Age	C13/C12 Ratio	Oxcal Calibrated Calendar Age (2 sigma)
1336-5	Beta-368383	Charcoal/AMS	TE-09/Feature B, 110-140 cmbs	110 +/- 30 BP	-25.3 o/oo	AD 1681-1739 (27.1 %) AD 1745-1763 (2.8 %) AD 1802-1938 (65.5 %)
1336-21	Beta-368384	Charcoal/AMS	TE-40E/Feature O, 80-90 cmbs	100 +/- 30 BP	-24.7 o/oo	AD 1682-1736 (27.1%) AD 1805-1935 (68.3 %)
1336-24	Beta-368385	Charcoal/AMS	TE-08/Feature A, 130-165 cmbs	40 +/- 30 BP	-23.7 o/oo	AD 1693-1728 (23.1 %) AD 1811-1920 (72.3 %)
1336-31	Beta-368386	Charcoal/AMS	TE-40D/Stratum IV, 80-90 cmbs	300 +/- 30 BP	-25.5 o/oo	AD 1685-1733 (26.3%) AD 1807-1928 (69.1 %)
1336-32	Beta-368387	Charcoal/AMS	TE-40D/Feature K, 110-120 cmbs	140 +/- 30 BP	-28.2 o/oo	AD 1489-1604 (69.6 %) AD 1611-1654 (25.8 %)

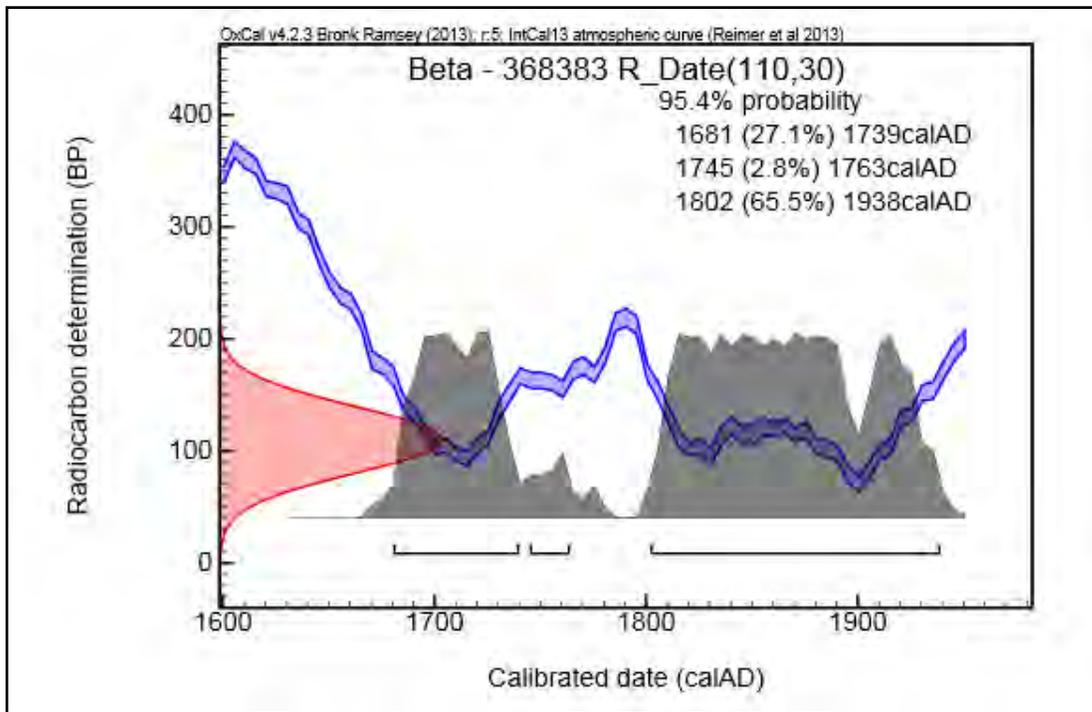


Figure 283. Graph showing results of radiocarbon analysis of charcoal collected from SIHP # -7580, Feature B (subsurface pit feature) at Test Excavation 9

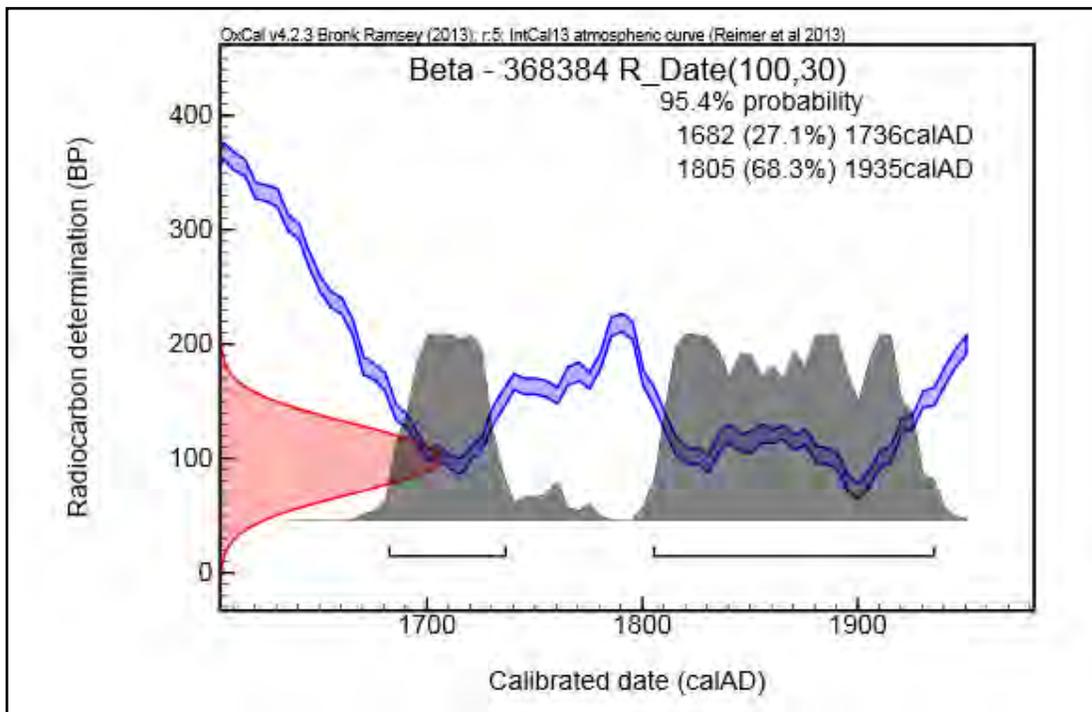


Figure 284. Graph showing results of radiocarbon analysis of charcoal collected from SIHP # -7580, Feature O (subsurface pit feature) at Test Excavation 40E

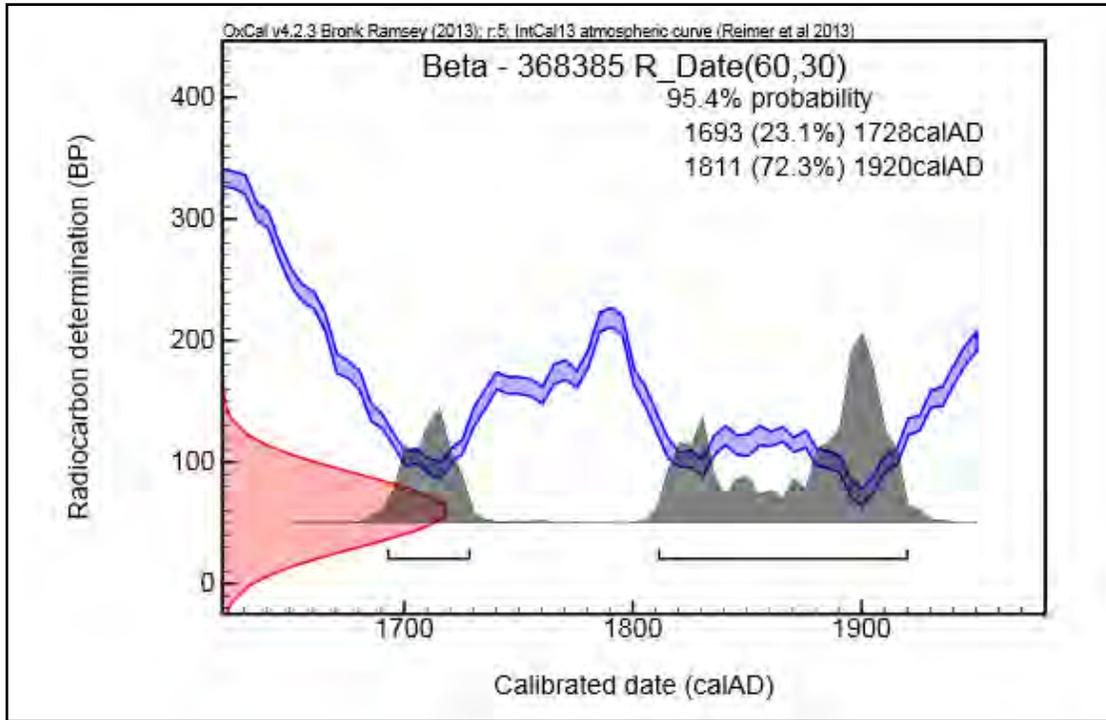


Figure 285. Graph showing results of radiocarbon analysis of charcoal collected from SIHP # -7580, Feature A (subsurface pit feature) at Test Excavation 8

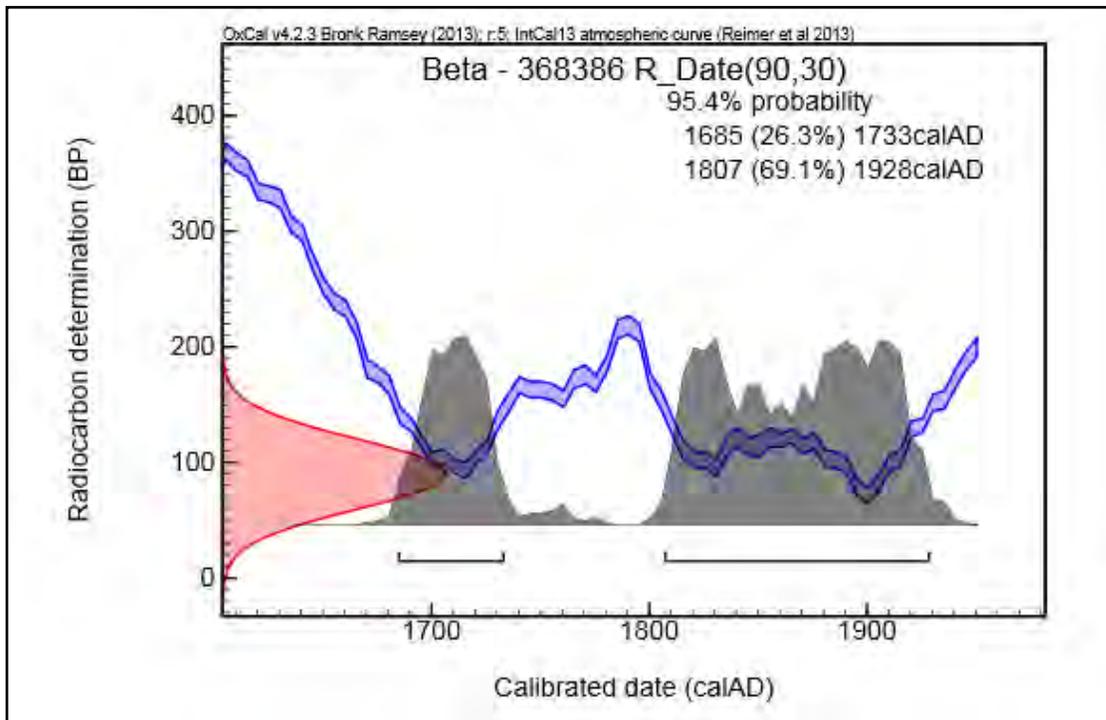


Figure 286. Graph showing results of radiocarbon analysis of charcoal collected from SIHP # -7580 (cultural layer) at Test Excavation 40D

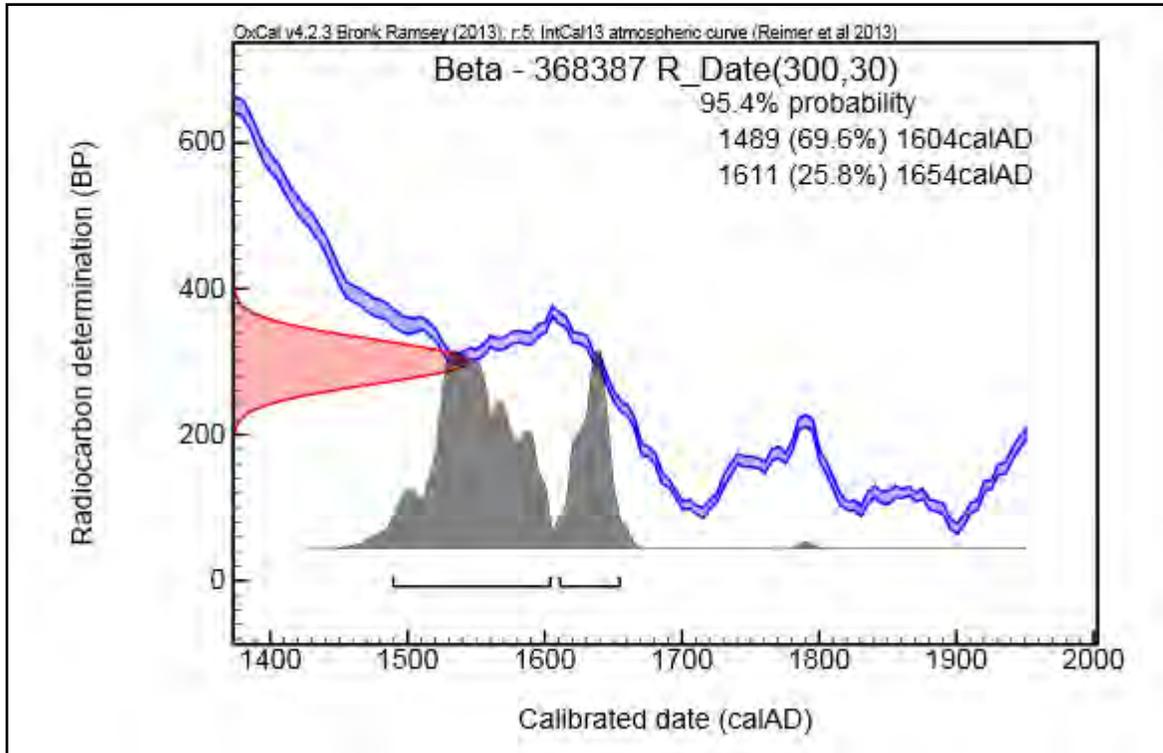


Figure 287. Graph showing results of radiocarbon analysis of charcoal collected from SIHP # -7580, Feature K (subsurface pit feature) at Test Excavation 40D

## Section 6 Consultation

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Consultation for this project has been on-going since May 2013 (Table 103). These consultation efforts began with developing the AIS sampling strategy with input from SHPD and the KS cultural stakeholders group (consisting of recognized cultural descendants from the greater Kaka'ako area). During the AIS fieldwork consultation involved providing the KS cultural stakeholder group, SHPD, and the O'ahu Island Burial Council (OIBC) with informational updates associated with burial finds. Site visits to the project area with the KS cultural stakeholder group, SHPD, and the OIBC were also part of this consultation process (see Table 103).

Following the completion of AIS fieldwork, consultation focused on seeking input from the KS cultural stakeholders group, the Office of Hawaiian Affairs (OHA), and SHPD regarding potential mitigation measures for historic properties (SIHP 7580, 7581, 7582, and 7583) recommended eligible under HAR §13-284-6 Criteria "e" (see Table 103).

During an April 4, 2014, KS cultural stakeholder meeting, potential mitigation measures for SIHP 7580, 7581, 7582, and 7583 were presented and discussed. KS proposed preservation in place for burials associated with SIHP 7580, 7581, and 7583, and relocation for SIHP 7582. The creation of a SIHP 7580 cultural layer archaeological preserve, which encompasses the SIHP 7580, 7581, and 7583 burials, was also proposed (see Section 9.2 Mitigation Recommendation below).

The KS cultural stakeholders did not oppose the KS proposed mitigation measures; however, they did make the following comments:

- Preferred the creation of an on-site temporary curation facility as opposed to preemptively installing empty vaults in anticipation of encountering inadvertent finds during project construction.
- Preferred burial treatment recommendations regarding the possible relocation of SIHP 7582 be deferred until the burial treatment plan process had been officially initiated (i.e., a burial public notice has been published and cultural/lineal descendants have been officially recognized).
- Agreed that a burial preserve be created for SIHP 7580, 7581, and 7583 burials.

Table 103. Summary of Project-Related Consultation

<b>Date</b>	<b>Consultation Group</b>	<b>Type</b>	<b>Purpose</b>
5/1/2013	Stakeholders	Meeting	Presentation on Blocks B, H and I trenching plans
5/8/2013	SHPD	Submittal	Block I Trenching Plan submitted to SHPD
5/31/2013	SHPD	Acceptance	SHPD acceptance of testing strategy for Block H
5/31/2013	SHPD	Acceptance	SHPD acceptance of testing strategy for Block I
5/31/2013	SHPD	Correspondence	Block I Trenching plan approval
6/21/2013	Stakeholders	Email	Notification of Burial Find #1
6/25/2013	Stakeholders	Email	Notification of site visit for 6/24
6/26/2013	Stakeholders	Email	Notification of burial #2
7/22/2013	Stakeholders	Email	Provided notes from Archeological Tour on June 25
7/23/2013	SHPD	Meeting	Site visit to Block H and I
8/8/2013	Stakeholders	Meeting	Discussion of Block H and I
9/11/2013	OIBC	Meeting	Presentation of Block B, H and I findings to Council
9/13/2013	Stakeholders	Email	Notification of expanded trenching around Trenches 25 and 40
9/17/2013	Stakeholders	Email	Notification of burials #3, #4, #5
9/18/2013	Stakeholders	Email	Notification of Burial #6 and #7
9/19/2013	Stakeholders	Email	Visit project area to view burials identified during AIS; 1 cultural stakeholder attended a site visit with KS and CSH staff
9/19/2013	Stakeholders	Site Visit	Visit project area to view burials identified during AIS; Attendees: Paulette Ka'anohi Kaleikini
9/23/2013	Stakeholders	Email	Scheduling of site visit to Block I
9/25/2013	Stakeholders	Site Visit	5 cultural stakeholders attended a site visit to the project area with KS and CSH staff
10/18/2013	Stakeholders	Email	Initiation of expanded trenching of Trench 40G
10/23/2013	Stakeholders	Email	Notification of Burial #10
10/23/2013	Stakeholders	Email	Notification of Burial #9

<b>Date</b>	<b>Consultation Group</b>	<b>Type</b>	<b>Purpose</b>
12/4/2013	Stakeholders	Meeting	Meeting to discuss findings at Block I
12/11/2013	OIBC	Meeting	Presentation of Block I findings to OIBC
2/12/2014	Stakeholders	Meeting	Meeting to introduce MKDC and discuss proposed mitigation plans
4/4/2014	Stakeholders	Meeting	Meeting to finalize proposed mitigation plans for AIS submittal

### 6.1.1 Preservation

The landowner, Kamehameha Schools, has agreed to establish a preserve in the *makai* (southeastern) portion of the project area (see Figure 245). It will preserve in situ (in place) preservation of the SIHP # -7580, -7581, and -7583 burials, a portion of the SIHP # -7580 cultural layer and any associated pit features and burials that may still exist within the proposed 54' x 69' (16.5 m x 21 m) preserve area (Figure 288 and Figure 289). This preserve will also include on-site preservation of the re-located SIHP # -7582 burial. A preservation plan will be prepared for this preserve, with particular emphasis on the section of the SIHP # -7580 cultural layer, pursuant to HAR §13-277.

Kamehameha Schools has proposed the following preservation measures for SIHP -7580 be considered:

- Dimensions around the archaeological preserve is approximately 54' x 69' (16.5 m x 21 m);
- Long term preservation measures include placement of a fill sediment over the cultural layer, over which would be placed a horizontal sheet of wire mesh and highly weather-resistant geotextile mesh fabric to ensure preservation of the cultural layer;
- Limiting construction related subsurface excavation within the archaeological preserve to a maximum of 50 cm below the grade;
- Marking the preserve boundaries with labeled bronze studs and installing a sign explaining the nature and extent of allowable subsurface disturbance within the preserve;
- Once the protective measures have been placed, then utilities, sprinkler system for landscaping, and surface parking and driveway may be installed above the preserve;
- The cultural layer (SIHP -7580) outside the preserve shall be subject to data recovery under an approved data recovery plan.

The preservation plan will be developed in accordance with requirements specified in HAR §13-277 and in consultation with Kamehameha Schools, SHPD, recognized descendants, and the Office of Hawaiian Affairs (OHA).

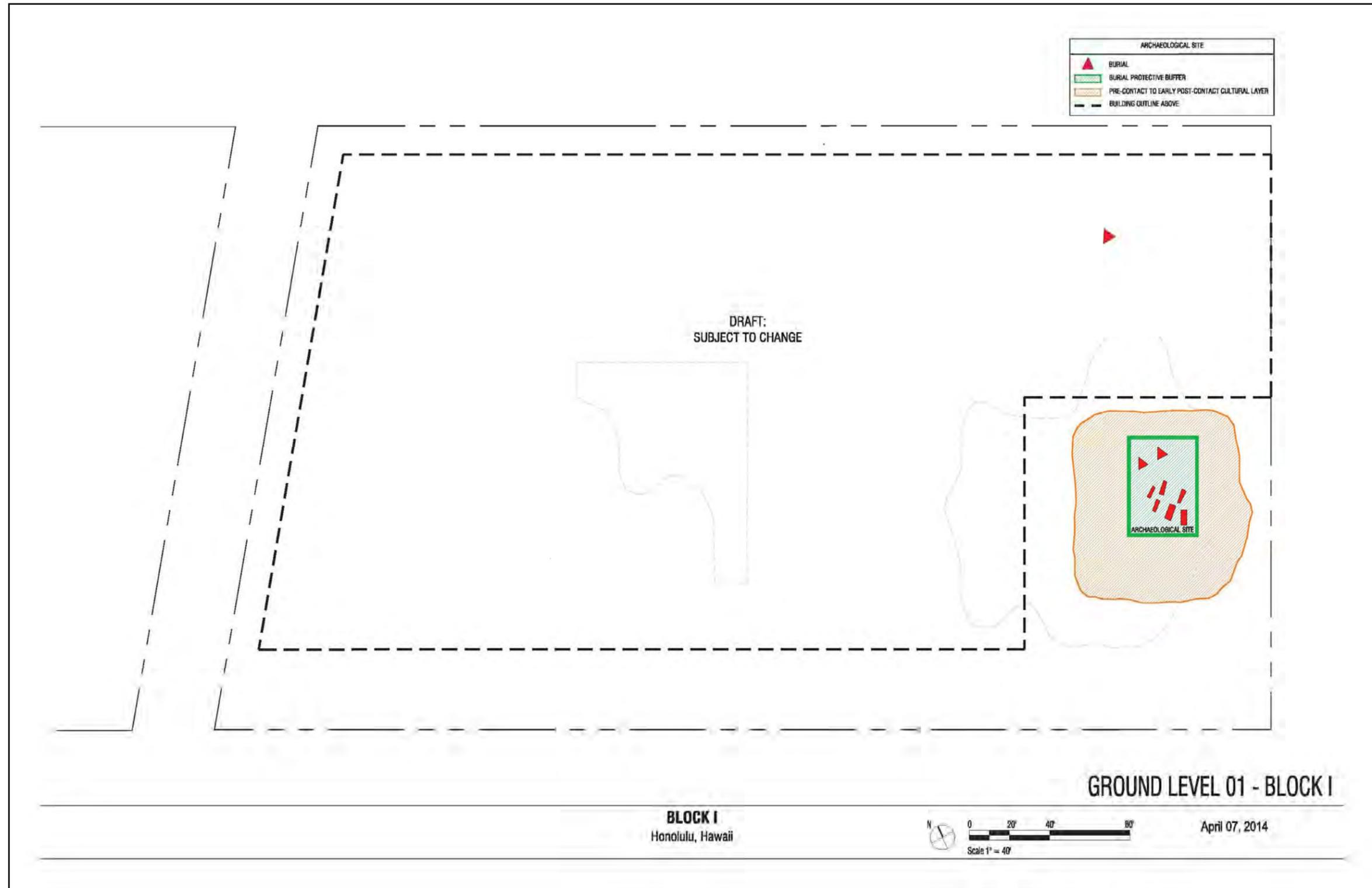


Figure 288. Proposed SIHP 50-80-14-7580 burial preserve and associated cultural layer archeological preserve locations (source: MKDC)

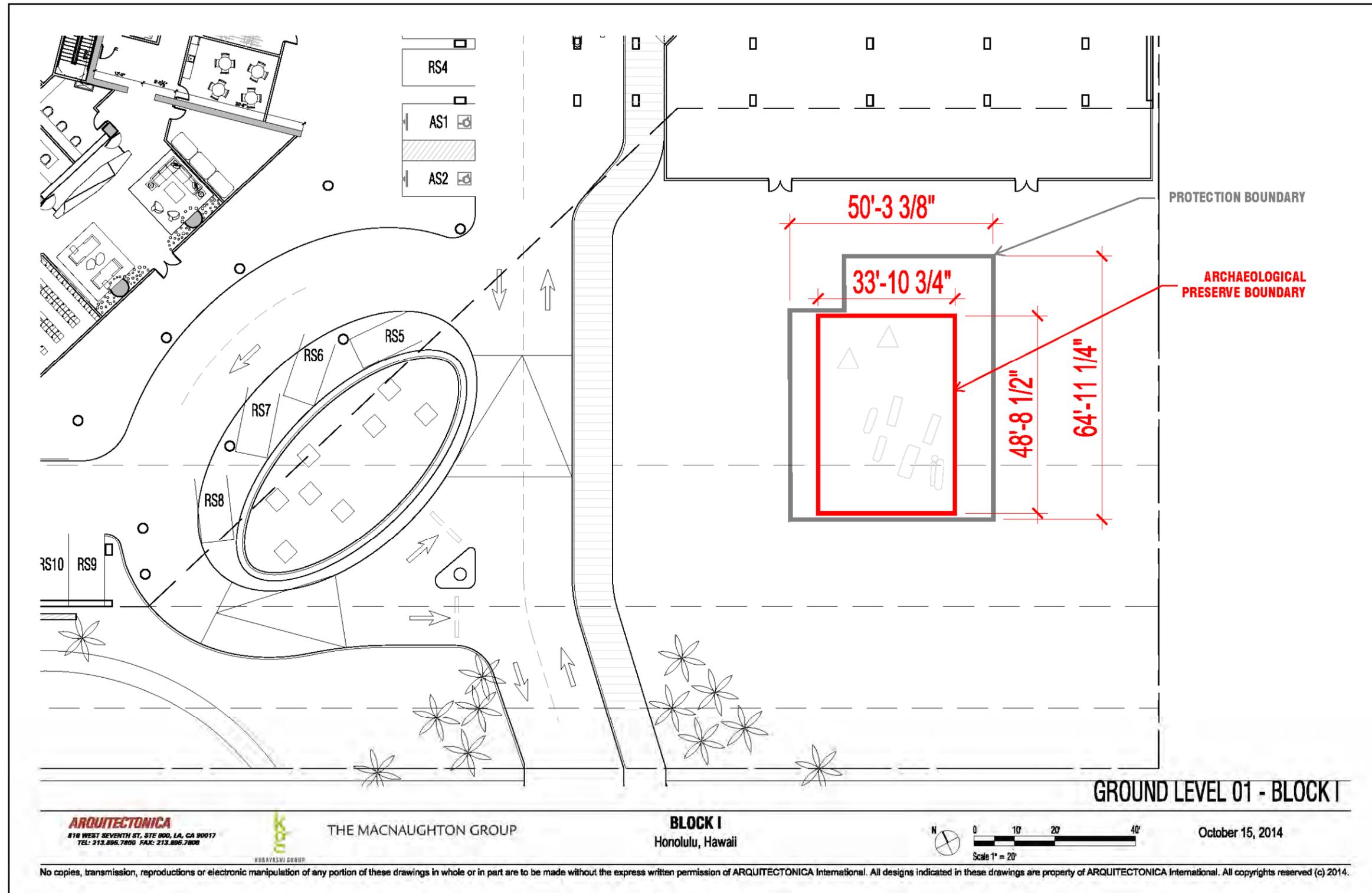


Figure 289. Proposed SIHP 50-80-14-7580 burial preserve

## Section 7 Summary and Interpretation

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At the request of Kamehameha Schools (KS), Cultural Surveys Hawai'i, Inc. (CSH) has prepared this archaeological inventory survey (AIS) for Kamehameha Schools Kaka'ako Block I, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu, TMK: [1] 2-1-056:002, 007 and 008. The project area is in downtown Honolulu in the area known as Kaka'ako, which is on the southern coastline of O'ahu. The project area is within the block bounded by Auahi Street, Ward Avenue, Ala Moana Boulevard, and Koula Street (see Figure 3).

The project area is being proposed for redevelopment in alignment with the Hawaii Community Development Authority (HCDA) approved KS Kaka'ako Master Plan. Ground-disturbing construction activities associated with the project will include demolition of existing structures, foundation slabs, and utility lines; implementation of new foundations, building footings, and retaining walls; installation of new utility lines (water, electrical, sewer, and drain lines); and possible environmental remediation.

The pedestrian inspection of the project area's surface confirmed there were no surface archaeological historic properties present. However, an architectural inventory survey of the project area established that most of the standing architecture within the project area is over 50 years old (Mason Architects, Inc. 2009). The architectural inventory survey stated that the historic buildings within the current project area "[l]acks significance associated with architectural distinction. No known association with a significant person or event. Lacks integrity due to significant alteration. Evaluated ineligible both individually or as part of a district for nomination to the National Register of Historic Places" (Mason Architects, Inc. 2009).

The subsurface testing program initially consisted of 46 machine-assisted test excavations, each measuring 6 m long by 0.8 m wide, for a total surface excavation of approximately 221 sq m (see Figure 36). However, upon identifying burial finds in Test Excavations 25 and 40, an additional 195 sq m was excavated in order to better delineate the horizontal extent of these burial finds. This additional subsurface testing consisted of the excavation of 15 additional test excavations of varying size, increasing the total surface area of excavation to 416 sq m or approximately 3.0% of the total project area.

Six historic properties were identified during subsurface testing consisting of a twentieth century cultural layer (SIHP # -7578); a twentieth century fill layer and associated building foundations (SIHP # -7579); and a pre- to post-Contact cultural layer with a historic burial cluster (SIHP # -7580), a pre-Contact traditional Hawaiian bundle burial (SIHP # -7581), and two sets of disarticulated human skeletal remains within non-burial contexts (SIHP #s -7582 and -7583) (Figure 290 and Table 104).

The observed stratigraphy indicates the project area had been subjected to intensive land reclamation mainly involving in-filling of low-lying areas. The land reclamation fill materials consisted primarily of crushed coral with smaller amounts of dredged marine clay. This fill is consistent with material known to have been utilized during large-scale land reclamation projects within the Kaka'ako area (ca. late nineteenth century to early twentieth century), including sand and ground-up coral (i.e., crushed coral) originating from dredging activities associated with the expansion of Honolulu Harbor and other marine-related development (Hawaii Department of

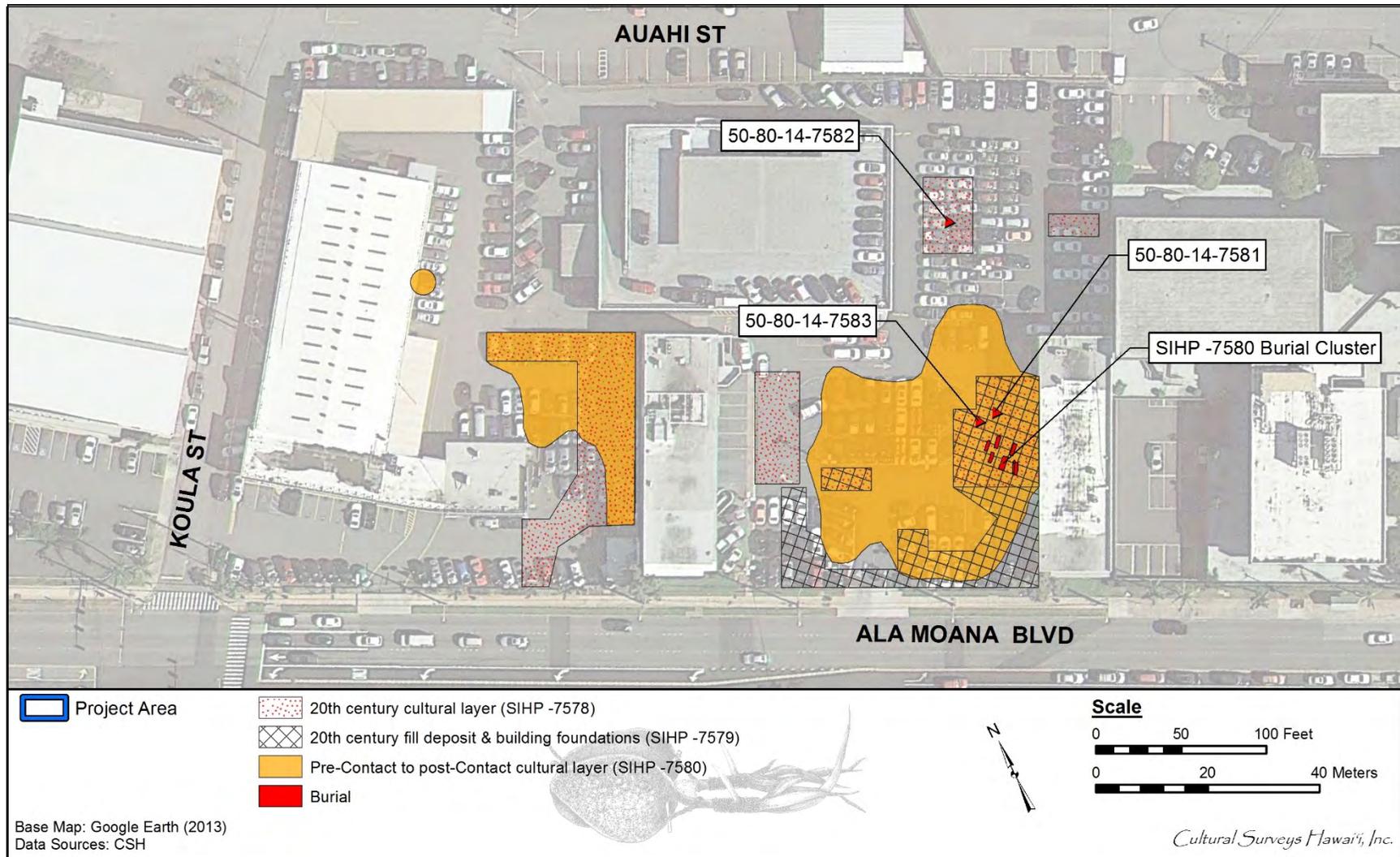


Figure 290. Historic properties identified within the project area

Table 104. Historic Properties Identified within the Project Area

SIHP #	Site Type	Function	Age	Significance Criteria	Recommended Mitigation
50-80-14-7578	Subsurface cultural layer and associated coral pavement and pit features (horse burial, postmolds, trash pits, and fire pits)	Habitation and commercial	Post-Contact (early to mid-twentieth century)	d	Archaeological monitoring
50-80-14-7579	Cultural fill layer and associated structural building remains	Commerical	Post-Contact (early twentieth century)	d	Archaeological monitoring
50-80-14-7580	Subsurface cultural layer and human burials	Habitation/burial	Pre-Contact to early post-Contact	d and e	Archaeological data recovery, burial treatment, preservation, and archaeological monitoring
50-80-14-7581	Traditional Hawaiian bundle burial	Burial	Pre-Contact	d and e	Burial treatment
50-80-14-7582	Disarticulated human skeletal remains	Isolated find location	Indeterminate	d and e	Burial treatment
50-80-14-7583	Disarticulated human skeletal remains	Isolated find location	Indeterminate	d and e	Burial treatment

Public Works 1914; Hawaii Supreme Court 1915). Historic accounts indicate that the vicinity of the project area was completely in-filled by 1914.

Observation of naturally deposited sediments capped beneath historic land reclamation fill prompted the designation of three stratigraphic zones within the project area (Figure 291). Each of the three stratigraphic zones coincides with discrete land forms and/or environmental zones that were present prior to historic in-filling and other land alterations associated with urbanization (i.e., stream channeling, etc.).

Stratigraphic Zone 1 occurs in the Diamond Head-*makai* portion of the project area (see Figure 291). The stratigraphic sequence within this zone consists of imported fill sediments (both historic and modern) atop a buried A horizon that formed atop naturally deposited Jaucas sand. Underlying the Jaucas sand are naturally deposited marine clays that developed atop the coral shelf (i.e., limestone bedrock). Stratigraphic Zone 1 represents a natural coastal sand dune that was elevated above the shoreline and surrounding semi-marine environment (tidal flats, coastal lagoons, etc.). The likelihood of encountering archaeologically sensitive cultural deposits (i.e., traditional Hawaiian cultural layers and burials, both traditional and historic) within this stratigraphic zone was predicted to be high.

Stratigraphic Zone 2 runs along the *mauka* edge of Stratigraphic Zone 1 and fans out at the 'Ewa-*makai* corner of the project area (see Figure 291). The stratigraphic sequence within this zone consists of imported fill sediments (both historic and modern) atop naturally deposited sandy clay that formed atop the coral shelf (i.e., limestone bedrock). Stratigraphic Zone 2 represents tidal flats that formed behind the sand dune (Stratigraphic Zone 1) and extended west ('Ewa) along the coast. This stratigraphic zone represents a semi-marine environment (i.e., tidal flats) that existed prior to historic land reclamation. The likelihood of encountering archaeologically sensitive cultural deposits (i.e., traditional Hawaiian cultural layers and burials, both traditional and historic) within this stratigraphic zone was predicted to be low; however, potential exists for encountering reclamation-related, or later, cultural layers and structural remnants (i.e., building foundations, wastewater infrastructure, etc.).

Stratigraphic Zone 3 consists of the *mauka* third of the project area (see Figure 291). The stratigraphic sequence within this zone consists of imported fill sediments (both historic and modern) atop naturally deposited marine clay that formed atop the coral shelf (i.e., limestone bedrock). The naturally deposited sediments observed in this zone consist of anaerobic soils that developed while completely waterlogged suggesting that Stratigraphic Zone 3 represents a coastal lagoon environment that formed behind the sand dune (Stratigraphic Zone 1). Prior to historic land reclamation, this zone would have been completely inundated with shallow slow moving water. The likelihood of encountering archaeologically sensitive cultural deposits (i.e., traditional Hawaiian cultural layers and burials, both traditional and historic) within this stratigraphic zone was predicted to be low; however, potential exists for encountering reclamation-related, or later, cultural layers and structural remnants (i.e., building foundations, wastewater infrastructure, etc.).

Of particular interest is SIHP # -7580, a pre-Contact to early post-Contact subsurface cultural layer. This buried A horizon (i.e., former land surface) developed atop naturally deposited marine sand that consisted of an elevated sand dune amidst a semi-marine environment prior to historic land reclamation of the greater Kaka'ako area. The layer is culturally enriched with

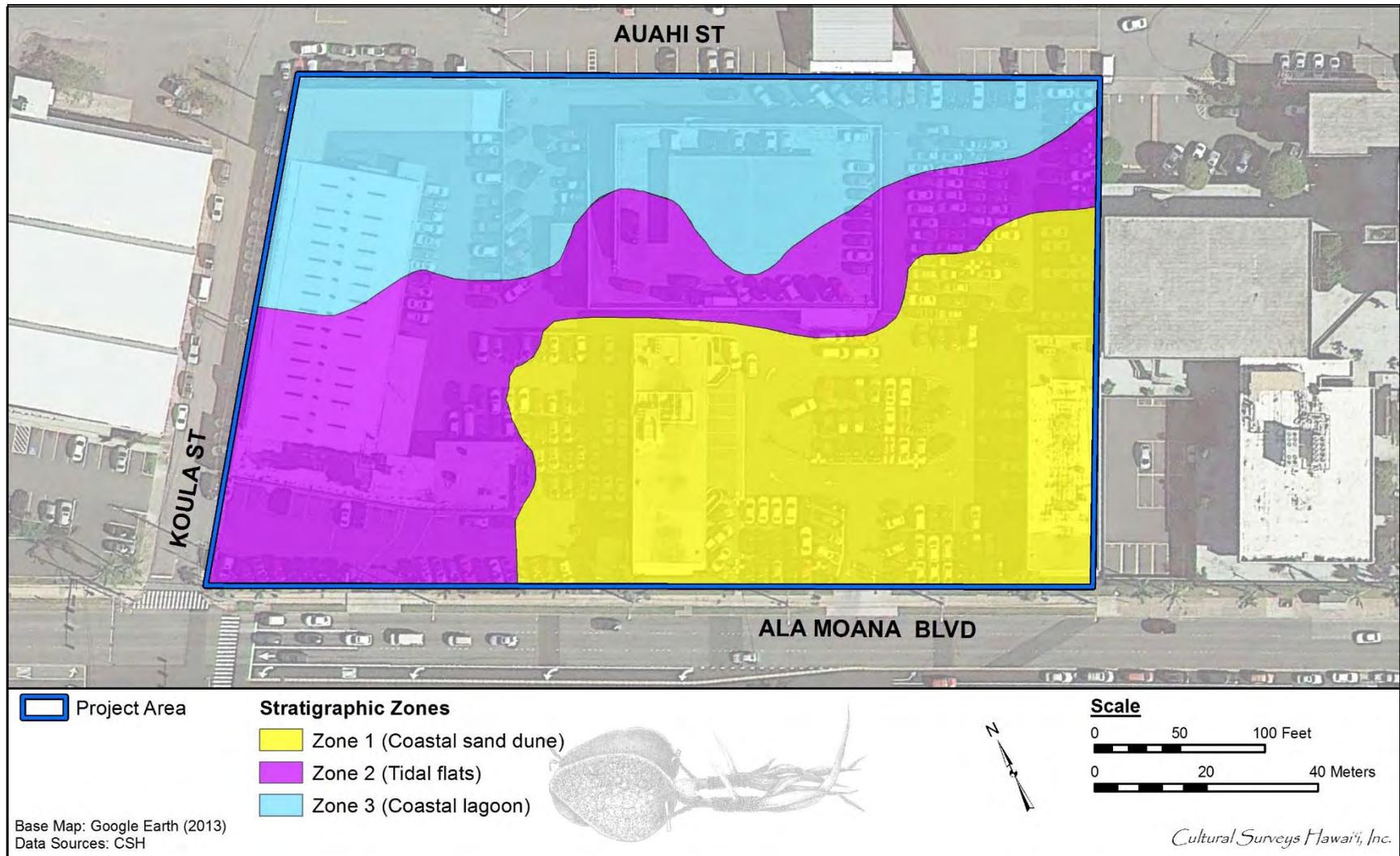


Figure 291. Stratigraphic zones present within the project area

charcoal, fire-cracked rock, shell midden and vertebrate food remains, and traditional Hawaiian and foreign-introduced artifacts, numerous subsurface pit features (fire pits, postmolds, cooking features, etc.), as well as a cluster of historic coffin burials and a single earlier traditional bundle burial.

Analysis of the artifact assemblage and charcoal (i.e., radiocarbon analysis) collected from SIHP # -7580 indicates the cultural layer was potentially utilized during the late pre-Contact and post-Contact periods. Additional samples need to be dated to substantiate this date range. (Note that while radiocarbon dates indicate date ranges into the 1900s, archaeological evidence and historic research indicates the cultural layer was capped by fill events and/or the SIHP # -7579 fill layer by 1900). Collected artifacts include traditional Hawaiian items such as an adze and a basalt sinker, as well as imported foreign material and an engraved mother-of-pearl English game counter originally manufactured in China pre-1840.

SIHP # -7579 consists of a localized fill layer that appears to be related to the construction of the Union Feed Company (ca. 1900). The artifacts collected from the fill layer are largely dated to the mid- to late- nineteenth century, with a couple that have a date range that spans into the early twentieth century. Fifteen concrete building foundations (SIHP # -7579, Features A-O) cut through the fill layer and extend down to the coral shelf. The fill layer and the building foundations appear to be a response to building atop a sand dune- both provide structural support for the structures associated with the Union Feed Company, which is depicted in the project area as early as 1900.

SIHP # -7578 consists of cultural layer that appears to be related to either, or both, the Union Feed Company and the residences and buildings that are depicted on historic fire insurances maps between 1927 and 1956. A crushed coral pavement (Feature P) and fifteen pits features (Features A-O) including trash pits, postmolds, a horse burial, a fire pit are considered components of SIHP # -7578. Artifacts collected from SIHP # -7578 cultural layer and associated features are dated between 1905 and 1950.

The archaeological record within the project area provides evidence of multiple periods of occupation by different groups of individuals influenced by vastly different cultural sensibilities. The initial occupation consisted of pre-Contact indigenous Hawaiians who were utilizing the coastal sand dune within the project area as a living surface and as an area for exploiting ocean resources. This occupation extended into the post-Contact period, when indigenous Hawaiians were exposed to western influences. During this transitional occupation phase indigenous Hawaiians began to adopt western technologies (e.g., utilization of guns and/or strike-a-lights) and cultural practices (e.g., extended burials within coffins). A dramatic shift then occurs following historic land reclamation (ca. late nineteenth to early twentieth century). At this time, the potential living surface within the project area is vastly expanded, via in-filling of lowland areas, and the indigenous Hawaiian population appears to have been supplanted by a mixture of European and Asian immigrants (based on the observed artifact assemblage collected from the project area). Traditional Hawaiian land use within the project area is no longer existent, a result of the western influenced urban expansion of Honolulu into Kaka'ako—where the project area is located—which became dominated by the Union Feed Company and, later, by dense clusters of residential dwellings and buildings associated with light industrial activity.

In summary, archaeological investigations within the project area have revealed the presence of rich archaeological deposits spanning from the pre-Contact period into the post-Contact period.

These deposits include subsurface cultural layers, human burials (both pre-Contact and post-Contact), and buried structural remnants (i.e., building foundations). These archaeological deposits are associated with traditional Hawaiian habitation, as well as historic land use (i.e. the Union Feed Company and the residences during the early to mid twentieth century).

## Section 8 Significance Assessments

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### 8.1 Significance Assessments

The archaeological inventory survey investigation and documentation of the project area's six historic properties has provided sufficient information for significance evaluations. Significance is determined after evaluation of the historic property in light of the five broad criteria specified in the Hawai'i Administrative Rule §13-284-6. These criteria are as follows:

- a Historic property reflects major trends or events in the history of the state or nation.
- b Historic property is associated with the lives of persons significant in our past.
- c Historic property is an excellent example of a site type.
- d Historic property has yielded or may be likely to yield information important in prehistory or history.
- e Historic property has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties.

SIHP # -7578 consists of an twentieth century cultural layer and 16 associated features. SIHP # -7578 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) pursuant to HAR §13-284-6. This evaluation is based on the site's association with the urban expansion of Honolulu into Kaka'ako through a large land reclamation effort that involved the infilling of the low lying areas to create additional land surfaces to be utilized for industrial and residential expansion. Archaeologists documented the remnant coral pavement, horse burial, postmolds, trash pits, and fire pits associated with the twentieth century cultural layer. This data is sufficient to characterize the extant portions of the SIHP # -7578 cultural layer. It is recommended for monitoring only.

SIHP # -7579 consists of a twentieth century fill layer and 15 building foundations that are related to the Union Feed Company. SIHP # -7579 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) pursuant to HAR §13-284-6. This evaluation is based on the site's association with the urban expansion of Honolulu into Kaka'ako through a large land reclamation effort that involved the infilling of the low lying areas to create additional land surfaces to be utilized for industrial and residential expansion. Archaeologists documented the remnants of the twentieth century fill layer and mapped the position of structural foundations associated with the Union Feed Company building. This data is sufficient to characterize the extant portions of the SIHP # -7579 cultural fill layer and its associated building foundations. Based on the interpolated boundaries of SIHP # -7579, it appears that approximately only 25 percent of the former property exists. Given that SIHP # -7579 lacks its original integrity and sufficient data has been collected from its extant portions, it is recommended for monitoring only.

SIHP # -7580 consists of a pre- to post-Contact cultural layer with a historic burial cluster. SIHP # -7580 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) and criterion "e" (has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties) pursuant to HAR §13-284-6. This evaluation is based on the density of pit features observed within the cultural layer and the presence of a burial cluster. The cultural layer also illustrates the diachronic change from pre-Contact traditional Hawaiian to early post-Contact western-influenced settlement. Given the historic property's information potential and the likelihood of encountering additional burials during ground disturbance activities, SIHP # -7580 is recommended for data recovery.

SIHP # -7581 consists of a pre-Contact traditional Hawaiian bundle burial. SIHP # -7581 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) and criterion "e" (has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties) pursuant to HAR §13-284-6.

SIHP # -7582 consists of disarticulated human skeletal remains within a non-burial context. SIHP # -7582 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) and criterion "e" (has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties) pursuant to HAR §13-284-6.

SIHP # -7583 consists of disarticulated human skeletal remains within a non-burial context. SIHP # -7583 is assessed as significant under Hawai'i state significance criterion "d" (has yielded or may be likely to yield information important in prehistory or history) and criterion "e" (has cultural significance to an ethnic group, including, but not limited to, religious structures, burials, and traditional cultural properties) pursuant to HAR §13-284-6.

## Section 9 Project Effect and Mitigation Recommendations

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### 9.1 Project Effect

CSH's project specific effect recommendation is "effect, with proposed mitigation commitments." The proposed development will adversely affect significant historic properties (SIHP #s -7578 through -7583) located with the project's APE.

### 9.2 Mitigation Recommendations

The recommended mitigation measures include Burial Treatment, Archaeological Data Recovery, Preservation, and Archaeological Monitoring.

#### 9.2.1 Burial Treatment

It is a requirement of Hawai'i state burial law that the treatment of the previously identified burial sites within the project area (SIHP #s -7580, -7581, -7582, and -7583) be addressed in a project specific burial treatment plan prepared for review and acceptance of the OIBC (HAR §13-300-33).

#### 9.2.2 Archaeological Data Recovery

In consultation with the SHPD, it has been determined that an archaeological data recovery program pursuant to HAR § 13-278 is an appropriate mitigation for SIHP # -7580 (pre- to post-Contact cultural layer). This archaeological data recovery program would begin with an archaeological data recovery plan for the review and acceptance of the SHPD. An End of Data Recovery Fieldwork Letter Report pursuant to HAR § 13-284-9(d) would need to be accepted by the SHPD prior to the construction project breaking ground.

#### 9.2.3 Preservation

The landowner, Kamehameha Schools, has agreed to establish a preserve in the *makai* (southeastern) portion of the project area. The preserve will ensure the in situ (in place) preservation of the SIHP # -7580, -7581, and -7583 burials, a portion of the SIHP # -7580 cultural layer and any associated pit features and burials that may still exist within the proposed 54' x 69' (16.5 m x 21 m) preserve area. This preserve will also include the on-site preservation of the re-located SIHP # -7582 burial. The preservation plan will be developed in accordance with requirements specified in HAR §13-277 and in consultation with Kamehameha Schools, SHPD, recognized descendants, and the Office of Hawaiian Affairs (OHA).

#### 9.2.4 Archaeological Monitoring

In order to mitigate the effect of the project on the identified historic properties (SIHP #s -7578, -7579, and -7580) and any yet to be identified historic properties (nonburial and burial), it is recommended that project construction proceed under an archaeological monitoring program. On-site monitoring is recommended for all ground disturbing activities and will include additional documentation of the identified cultural layers/deposits (SIHP #s -7578, -7579, and -7580) and their associated features in areas not tested during the AIS. This monitoring program will also include the collection and analysis of artifacts and samples from these historic properties. This monitoring program will facilitate the identification and proper treatment of any burials that might

be discovered during project construction, and will gather additional information regarding the project's non-burial archaeological deposits. Given the sensitivity of the project area's location, it is recommended that an archaeological monitor be present during all subsurface activities conducted during the construction of the proposed project.

### **9.3 Disposition of Materials**

The complete collection of artifacts associated with this archaeological inventory survey was collected from private lands; accordingly, this material belongs to the landowner, Kamehameha Schools. This collection is comprised of materials collected from SIHP #s -7578, 7579, and -7580 documented within the project area. The artifacts associated with this archaeological inventory survey will be temporarily housed at the CSH storage facility. CSH will make arrangements with the landowner regarding the disposition of the project's collection. Should the landowner request archiving of material, then the archive location will be determined in consultation with SHPD.

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# Appendix A SHPD Correspondence

<p>NEIL ABERCROMBIE GOVERNOR OF HAWAII</p>		<p>WILLIAM J. AILA, JR. CHAIRPERSON BOARD OF LAND AND NATURAL RESOURCES COMMISSION ON WATER RESOURCE MANAGEMENT</p>
	<p><b>HISTORIC PRESERVATION DIVISION DEPARTMENT OF LAND AND NATURAL RESOURCES</b></p>	<p>ESTHER KIA'ADNA FIRST DEPUTY</p>
	<p>601 Kamehaha Boulevard, Suite 555 Kapolei, HI 96806</p>	<p>WILLIAM M TAM DEPUTY DIRECTOR - WATER  AQUATIC RESOURCES BOATING AND OCEAN RECREATION BUREAU OF CONSERVATION COMMISSION ON WATER RESOURCE MANAGEMENT CONSERVATION AND COASTAL LANDS CONSERVATION AND RESOURCE ENFORCEMENT ENGINEERING FORESTRY AND WILDLIFE HISTORIC PRESERVATION KAOHOLAWE ISLAND RESERVE COMMISSION LAND STATE PARKS</p>

May 31, 2013

Doug Borthwick  
Cultural Surveys Hawai'i, Inc.  
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LOG NO: 2013.3486  
DOC NO: 1305SL43  
Archaeology

Dear Mr. Borthwick:

**SUBJECT: Chapter 6E-42 Historic Preservation Review –  
Archaeological Inventory Survey Testing Strategy for Kamehameha Schools Kaka'ako Block I  
Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu Island  
TMK (1) 2-1-056: 002, 007, and 008**

Thank you for the opportunity to consult and to review this draft document titled *Archaeological Inventory Survey Testing Strategy for Kamehameha Schools Kaka'ako Block I, Honolulu Ahupua'a, Honolulu (Kona) District, O'ahu Island TMK (1) 2-1-056:002, 007, and 008* (Tulchin, May 2013). Our office received this submittal on May 21, 2013.

The project area consists of 3.4 acres bounded on the west by Koula Street, Ala Moana Boulevard, the east by additional lots 'Ewa of Ward Avenue, on the north by Auahi Street. About 50% of the property is covered by structures, the remaining consists of paved parking areas.

The archaeological inventory survey will involve a 100% pedestrian survey of all open areas and excavation of an anticipated 47 backhoe trenches. Testing will concentration on open areas with some trenches within existing structures, where feasible. Subsurface testing will involve (1) backhoe removal of the fill deposits, (2) backhoe scraping of underlying natural and/or cultural deposits other than Jaucas sand, and (3) and excavation of Jaucas sand deposits.

This document serves to facilitate project planning and supports the historic preservation review process. We concur with the proposed archaeological inventory survey testing strategy which includes continued consultation with SHPD and interested parties. Please send one hardcopy of the document for inclusion in our correspondence files, clearly marked FINAL, along with a copy of this review letter to Kapolei SHPD office, attention Dr. Susan Lebo.

Please contact me at (808) 692-8019 or [Susan.A.Lebo@hawaii.gov](mailto:Susan.A.Lebo@hawaii.gov) if you have any questions or concerns regarding this letter.

Aloha,



Susan A. Lebo, PhD  
Oahu Lead Archaeologist

cc: Jon Tulchin, [jtulchin@culturalsurveys.com](mailto:jtulchin@culturalsurveys.com)

# Appendix B IARII Wood ID Analysis

## RADIOCARBON SAMPLE SCREENING FOR KAKAAKO 101 PROJECT, KAKA'AKO, O'AHU ISLAND

Gail M. Murakami  
December 11, 2013

### INTRODUCTION

This report presents the results of taxa identification in charcoal samples from the Cultural Surveys Hawaii Kakaako 101 Project in Kaka'ako, O'ahu. The identification of charcoal found in archaeological context can give insight into the vegetation of the surrounding area at the time the woods were burned. This information can then be used to interpret the environment as well as possible cultural use of specific plants. In addition, the screening of charcoal samples for the absence of historically introduced plants gives some assurance that the sample does not represent the remains of modern activities. The selection of native short-lived plants and plant parts for radiocarbon dating lessens the effect of in-built age.

### METHODS

Six charcoal samples from the Kakaako 101 Project were examined for taxa identification. The freshly fractured transverse and tangential facets of each charcoal piece were viewed under magnification of a dissecting microscope. Taxa identifications were made by comparing the anatomical characteristics seen during examination against those of known woods in the Pacific Islands Wood Collection at the Department of Botany, University of Hawai'i, and published descriptions.

### RESULTS

Eleven taxa were identified while another 11 taxa remain unidentified in the six samples analyzed. In addition, charcoal identified as possible palms (Arecaceae) and one resembling pine (Pinaceae) were noted in the assemblage. A description of the identified taxa is presented below. The summary of results is presented in Table 1. In Table 1, "cf." indicates that the charcoal resembles the taxon specified but its exact identity is uncertain at this time.

### TAXA REVIEW

#### *Aleurites moluccana* (L.) Willd. (*Kukui*)

Once cultivated, this Polynesian introduction has escaped into the native forest, where the pale foliage of the 10 to 20 m trees (Wagner et al. 1990:598) can be seen in abundance in moist gulches and valleys. Dyes were once extracted from the bark and roots (Buck 1957:187), the oily kernel was burned for light (Buck 1957:107) or eaten as a relish after baking (Buck 1957:48), and net floats and dugout canoes were made from the soft wood (Buck 1957:297).

#### Arecaceae (Palm Family)

This family of palms is distributed in nearly all tropical and subtropical regions worldwide and even to some warm temperate areas. In Hawai'i, there is one native genus, *Pritchardia*, and perhaps three species of naturalized palms, including coconut (Wagner et al. 1990:1361).

#### *Chenopodium oahuense* (Meyen) Aellen ('Āheheha, 'āweoweo)

This endemic species is usually a shrub in the coastal lowlands but may become arborescent at higher elevations (Hillebrand 1981:380). Its known distribution in the main Hawaiian Islands includes coastal, dry forest, and subalpine shrubland at 0 to 2,520 meters elevation (Wagner et al. 1990:538). The soft wood was probably not used by the ancient Hawaiians but the leaves were cooked and eaten as greens (Hillebrand 1981:380; Malo 1951:23).

#### *Diospyros sandwicensis* (A. DC) Fosb. (*Lama*)

This small endemic tree, 2 to 10 m tall, is found in wet or dry regions of all the main Hawaiian Islands (Rock 1913:395; Wagner et al. 1990:587). Its hard wood was once used by Hawaiians for houses, enclosures for certain idols (Malo 1951:21), and chisel handles (Buck 1957:38). Hillebrand (1888:275) reported that the small fruits were eaten by the natives.

#### *Dodonaea viscosa* Jacq. ('A'ali'i)

These indigenous shrubs or small trees are 2 to 8 m tall and range in distribution from coastal dunes to dry, mesic, and wet forest, at 3 to 2,350 m elevations on all of the main Hawaiian Islands (Wagner et al. 1990:1227-1228). The red papery fruit capsule clusters and leaves of some varieties were made into *lei* (Pukui and Elbert 1986:3).

#### *Hibiscus tiliaceus* L. (*Hau*)

This indigenous plant is described by Handy and Handy (1972:232-233) as a "large-leaved shrublike tree" which was planted near houses and gardens. The straight-stemmed variety was once planted for bast fibers from which cords, ropes, and coarse *tapa* cloth were made. Its soft wood was used to make canoe outriggers, fishnet floats, and fire by rubbing a harder wood against it. The creeping variety was used for windbreaks. This species occurs primarily along coasts, streams, and other wet areas up to 1,220 m in elevation on all main islands although not documented from Ni'ihau and Kaho'olawe (Wagner et al. 1990:888).

#### *Leucaena leucocephala* (Lam.) de Wit (*Koa haole*)

This woody shrub or small tree is native to tropical America and was first recorded from the Pacific Islands in 1837 in Hawai'i (Whistler 1995:85). Originally cultivated for such uses as fodder, firewood, erosion control, shade trees for coffee, and seeds for necklaces, it has naturalized in dry, disturbed, low elevation areas on all the main Hawaiian Islands (Wagner et al. 1990:680).

#### *Metrosideros polymorpha* Gaud. ('Ōhi'a lehua)

This endemic species ranges in habit from prostrate shrubs to tall trees and in distribution from sea level to 2200 m elevation in many ecological situations on all of the main Hawaiian Islands (Wagner et al. 1990:967). The hard wood was once used for making spears and mallets, idols, posts and rafters for houses, and enclosures around temples (Buck 1957:87; Malo 1951:20; Neal 1965:638).

#### *Myrsine lanaiensis* Hillebr. (*Kōlea*)

These endemic small trees stand 3 to 6 m tall and inhabit the dry forest to occasionally mesic forest with an elevational range of 300 to 1,000 m on all the main islands except Ni'ihau and Kaho'olawe (Wagner et al. 1990:941-942).

#### Pinaceae

The family Pinaceae consists of 225 species of resinous trees or rarely shrubs, including well known conifers of commercial importance such as cedars, firs, hemlocks, larches, pines and spruces, found mostly in temperate regions of the Northern Hemisphere. None of the Pinaceae is native to the Hawaiian Islands and nor known to have naturalized.

*Pseudotsuga menziesii* (Mirabel) Franco (Douglas fir)

This large evergreen tree which may be up to 61 m (200 ft.) in height is found from central British Columbia south along the coast to central California and from the Rocky Mountains to southeast Arizona and Texas. Pockets of these trees may be found in north and central Mexico (Little 1994:294-295). The wood has been used in building and construction as lumber, timbers, piling and plywood; as veneer; railroad ties; pulp; planing-mill products such as sash, doors, flooring, and general millwork; boxes and crates; ship- and boatbuilding; and furniture (Brown and Panshin 1940:395-396).

*Psychotria* sp. (*Kōpiko*)

This large genus is distributed over tropical regions of both the New and Old Worlds. The 11 species of *Psychotria* in Hawai'i are small to medium sized endemic trees which are found in the mesic to wet forests. The five species, known from O'ahu, are *P. fauriei*, *P. hathewayi*, *P. hexandra*, *P. kaduana*, and *P. maritima*. These species range from small trees to trees up to 20 m tall and occur mainly in mesic to wet forests (Wagner et al. 1990:1160-1170). Its wood was previously used as firewood and to make *kapa* logs (Malo 1951:21).

*Syzygium* sp.

Four species of these trees are found on O'ahu. *Syzygium cumini* (Java plum) and *S. jambos* (rose apple) have naturalized in the mesic forests after their introduction prior to 1871 and in 1825, respectively. The Polynesian introduction *S. malaccense* (mountain apple, 'ōhi'a 'ai) may be found in low mesic to wet forests while the native *S. sandwicensis* ('ōhi'a hā) seems to be restricted to ridges and slopes on Kaua'i, O'ahu, Moloka'i, Lāna'i and Maui (Wagner et al. 1990:975-976). The trunks from 'ōhi'a 'ai were formerly used for posts, house rafters and temple enclosures; idols were also carved from the wood. The fruit was eaten and the bark, flowers and leaves were used medicinally (Rock 1974:323). A dye for clothing was extracted from the bark (Buck 1957:187).

Table 1. Charcoal Taxa Identification in Samples from the Kakaako 101 Project, O'ahu.

Sample ID #: Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight, g
1: TE-09, Stratum IV, Feature B, 110-140 cmbd	1336-1	Not identified			Bark	2	0.60
	1336-2	Unknown 1			Stem	5	2.76
	1336-3	cf. <i>Psychotria</i> sp.	<i>Kōpiko</i>	Native/Shrub-Tree	Wood	6	1.16
	1336-4, 7	cf. <i>Metrosideros polymorpha</i>	<i>ʻŌhiʻa lehua</i>	Native/Tree	Wood	25	4.77
	1336-5	<i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian Introduction/Tree	Nutshell	14	2.38
	1336-6	Unknown 2			Wood	5	0.54
	1336-8	<i>Diospyros sandwichensis</i>	<i>Lama</i>	Native/Tree	Wood	1	0.43
	1336-9	Areaceae	Palm	—/Tree	cf. Petiole	1	0.06
	1336-10	cf. <i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian Introduction/Tree	Wood	7	0.20
	1336-11	cf. <i>Dodonaea viscosa</i>	<i>ʻAʻaliʻi</i>	Native/Shrub	Wood	1	0.08
	1336-12	cf. Areaceae	Palm	—/Tree	Steles	5	0.07
	1336-13	cf. <i>Pseudotsuga menziesii</i>	Douglas fir	Alien/Tree	Wood	1	0.05
	1336-14	Unknown 3			Wood	3	0.14
	2: TE-44, Stratum III, Sample Area #1, 90-120 cmbd	1336-15	Unknown 4			Wood	5
1336-16		Unknown 5, cf. temperate hardwood		Alien/Tree	Wood	4	1.02
1336-17		cf. <i>Metrosideros polymorpha</i>	<i>ʻŌhiʻa lehua</i>	Native/Tree	Wood	3	0.81
1336-18		Unknown 6, cf. temperate hardwood		Alien/Tree	Wood	5	0.39
1336-19		cf. <i>Leucaena leucocephala</i>	<i>Koa haole</i>	Historic Introduction/Shrub -Tree	Wood	2	0.49
1336-20		cf. Pinaceae	Pine	Alien/Tree	Wood	1	0.88
3: TE-40E, Stratum IV, Feature O, 80-90 cmbd	1336-21	Unknown 7			Wood	35	2.62
4: TE-08, Stratum Vb, Feature A, 130-165 cmbd	1336-22	Unknown 8			Wood	1	0.04
	1336-23	Unknown 3			Wood	1	0.04
	1336-24	<i>Aleurites moluccana</i>	<i>Kukui</i>	Polynesian Introduction/Tree	Nutshell	7	0.48

Sample ID #	Provenience	WIDL No.	Taxa	Common/ Hawaiian Name	Origin/Habit	Part	Count	Weight, g
5:	TE-40D, Stratum IV, Feature K, 110-120 cmbd	1336-32	<i>Hibiscus tiliaceus</i>	<i>Hau</i>	Native/Shrub-Tree	Wood	13	13.74
6:	TE-40D, Stratum IV, Sample Area #1, 80-90 cmbd	1336-25	Unknown 9			Wood	4	2.83
		1336-26	Unknown 10			Wood	24	6.65
		1336-27	Unknown 11			Wood	5	0.83
		1336-28	cf. <i>Syzygium</i> sp.	Mountain apple, roseapple, Java plum. <i>'Ōhi'a ai</i>	Native + Historic Introductions/Tree	Wood	3	0.20
		1336-29	<i>Chenopodium oahuense</i>	<i>'Āheahea</i>	Native/Shrub	Wood	1	0.11
		1336-30	Unknown 3			Wood	5	0.54
1336-31	cf. <i>Myrsine lanaiensis</i>	<i>Kōlea</i>	Native/Tree	Wood	10	2.66		

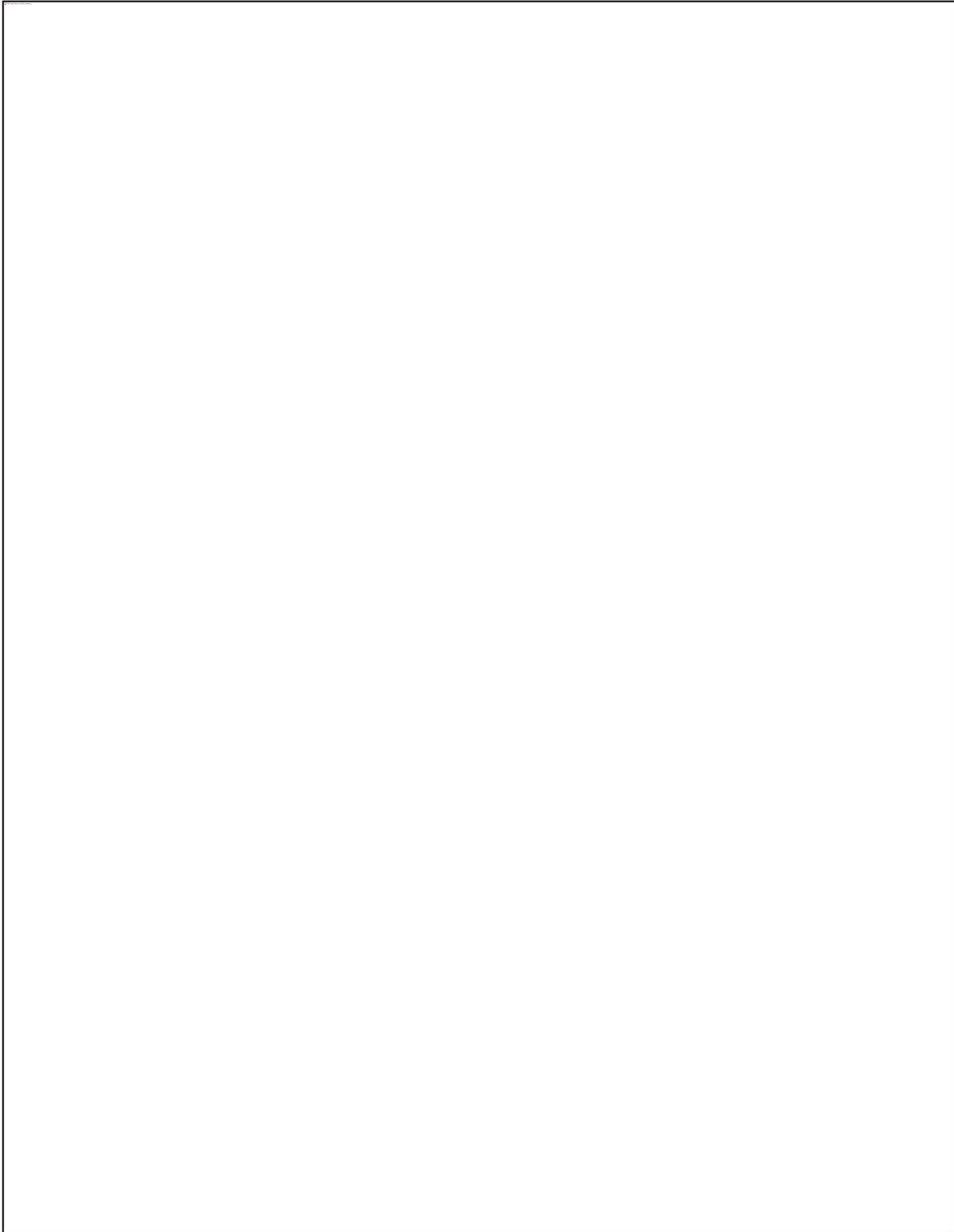
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# Appendix C    **Beta Analytic Radiocarbon Analysis**

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**BETA ANALYTIC INC.**

DR. M.A. TAMERS and MR. D.G. HOOD

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 MIAMI, FLORIDA, USA 33155  
 PH: 305-667-5167 FAX:305-663-0964  
 beta@radiocarbon.com

**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Hallett H. Hammatt/Jon Tulchin

Report Date: 1/15/2014

Cultural Surveys Hawaii

Material Received: 12/23/2013

Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 368383 SAMPLE : 1336-5 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1680 to 1760 (Cal BP 270 to 190) AND Cal AD 1770 to 1780 (Cal BP 180 to 170) Cal AD 1800 to 1940 (Cal BP 150 to 10) AND Cal AD Post 1950	110 +/- 30 BP	-25.3 o/oo	110 +/- 30 BP
Beta - 368384 SAMPLE : 1336-21 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1680 to 1740 (Cal BP 270 to 210) AND Cal AD 1760 to 1760 (Cal BP 190 to 190) Cal AD 1800 to 1940 (Cal BP 150 to 10) AND Cal AD Post 1950	100 +/- 30 BP	-24.7 o/oo	100 +/- 30 BP
Beta - 368385 SAMPLE : 1336-24 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1690 to 1730 (Cal BP 260 to 220) AND Cal AD 1810 to 1840 (Cal BP 140 to 110) Cal AD 1840 to 1850 (Cal BP 110 to 100) AND Cal AD 1860 to 1860 (Cal BP 90 to 90) AND Cal AD 1870 to 1920 (Cal BP 80 to 30) AND Cal AD Post 1950	40 +/- 30 BP	-23.7 o/oo	60 +/- 30 BP
Beta - 368386 SAMPLE : 1336-31 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1680 to 1730 (Cal BP 270 to 220) AND Cal AD 1810 to 1930 (Cal BP 140 to 20) Cal AD Post 1950	140 +/- 30 BP	-28.2 o/oo	90 +/- 30 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the <sup>14</sup>C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby <sup>14</sup>C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured <sup>13</sup>C/<sup>12</sup>C ratios (delta <sup>13</sup>C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta <sup>13</sup>C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta <sup>13</sup>C, the ratio and the Conventional Radiocarbon Age will be followed by \*\*\*. The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.



**BETA ANALYTIC INC.**

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 beta@radiocarbon.com

**REPORT OF RADIOCARBON DATING ANALYSES**

Dr. Hallett H. Hammatt/Jon Tulchin

Report Date: 1/15/2014

Sample Data	Measured Radiocarbon Age	<sup>13</sup> C/ <sup>12</sup> C Ratio	Conventional Radiocarbon Age(*)
Beta - 368387 SAMPLE : 1336-32 ANALYSIS : AMS-Standard delivery MATERIAL/PRETREATMENT : (charred material): acid/alkali/acid 2 SIGMA CALIBRATION : Cal AD 1490 to 1600 (Cal BP 460 to 350) AND Cal AD 1610 to 1650 (Cal BP 340 to 300)	310 +/- 30 BP	-25.5 ‰	300 +/- 30 BP

Dates are reported as RCYBP (radiocarbon years before present, "present" = AD 1950). By international convention, the modern reference standard was 95% the <sup>14</sup>C activity of the National Institute of Standards and Technology (NIST) Oxalic Acid (SRM 4990C) and calculated using the Libby <sup>14</sup>C half-life (5568 years). Quoted errors represent 1 relative standard deviation statistics (68% probability) counting errors based on the combined measurements of the sample, background, and modern reference standards. Measured <sup>13</sup>C/<sup>12</sup>C ratios (delta <sup>13</sup>C) were calculated relative to the PDB-1 standard.

The Conventional Radiocarbon Age represents the Measured Radiocarbon Age corrected for isotopic fractionation, calculated using the delta <sup>13</sup>C. On rare occasion where the Conventional Radiocarbon Age was calculated using an assumed delta <sup>13</sup>C, the ratio and the Conventional Radiocarbon Age will be followed by \*\*\*. The Conventional Radiocarbon Age is not calendar calibrated. When available, the Calendar Calibrated result is calculated from the Conventional Radiocarbon Age and is listed as the "Two Sigma Calibrated Result" for each sample.

## **CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variables: C13/C12=-25.3;lab. mult=1)

**Laboratory number: Beta-368383**

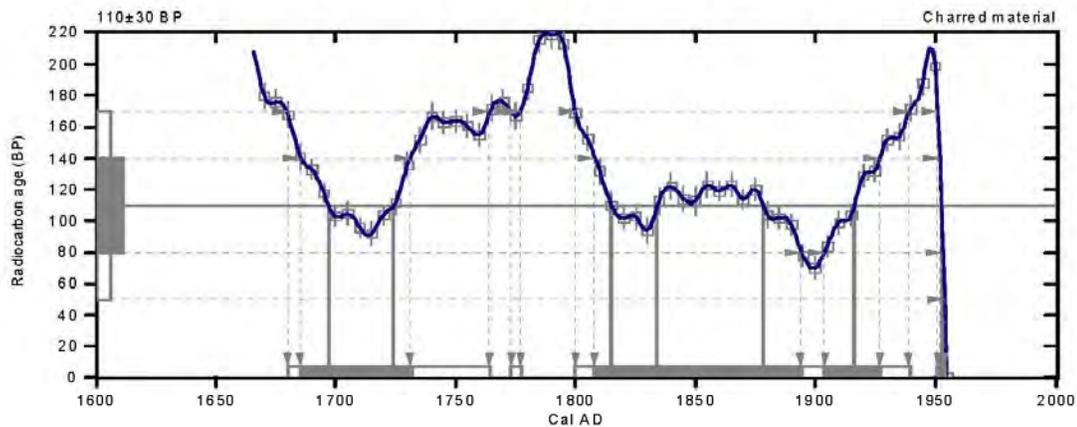
**Conventional radiocarbon age: 110±30 BP**

**2 Sigma calibrated results: Cal AD 1680 to 1760 (Cal BP 270 to 190) and  
(95% probability) Cal AD 1770 to 1780 (Cal BP 180 to 170) and  
Cal AD 1800 to 1940 (Cal BP 150 to 10) and  
Cal AD Post 1950**

Intercept data

Intercepts of radiocarbon age  
with calibration curve: Cal AD 1700 (Cal BP 250) and  
Cal AD 1720 (Cal BP 230) and  
Cal AD 1820 (Cal BP 140) and  
Cal AD 1830 (Cal BP 120) and  
Cal AD 1880 (Cal BP 70) and  
Cal AD 1920 (Cal BP 30) and  
Cal AD Post 1950

**1 Sigma calibrated results: Cal AD 1680 to 1730 (Cal BP 260 to 220) and  
(68% probability) Cal AD 1810 to 1890 (Cal BP 140 to 60) and  
Cal AD 1900 to 1930 (Cal BP 50 to 20) and  
Cal AD Post 1950**



### References:

#### Database used

*INTCAL09*

#### References to INTCAL09 database

*Heaton, et al., 2009, Radiocarbon 51(4):1151-1164, Reimer, et al., 2009, Radiocarbon 51(4):1111-1150,*

*Stuiver, et al., 1993, Radiocarbon 35(1):1-244, Oeschger, et al., 1975, Tellus 27: 168-192*

#### Mathematics used for calibration scenario

*A Simplified Approach to Calibrating C14 Dates*

*Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322*

## **Beta Analytic Radiocarbon Dating Laboratory**

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## **CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variables: C13/C12=-24.7;lab. mult=1)

Laboratory number: **Beta-368384**

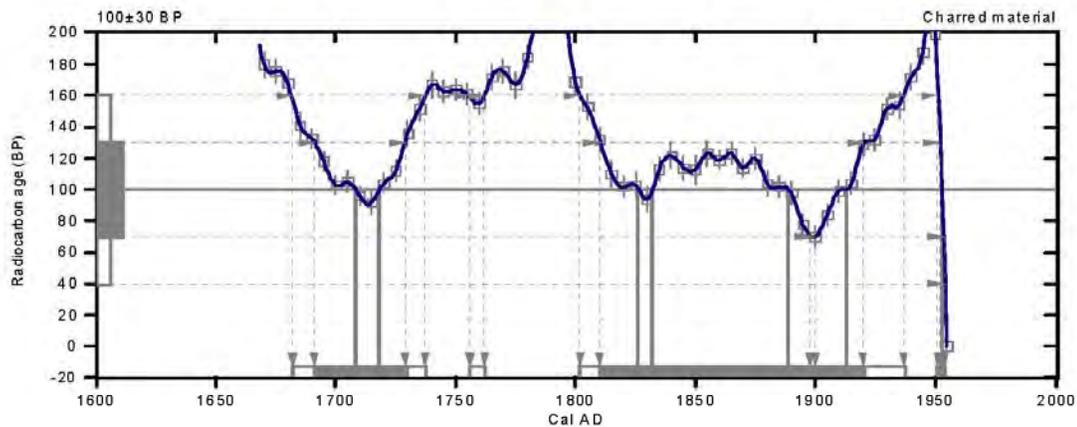
Conventional radiocarbon age: **100±30 BP**

**2 Sigma calibrated results:** Cal AD 1680 to 1740 (Cal BP 270 to 210) and  
(95% probability) Cal AD 1760 to 1760 (Cal BP 190 to 190) and  
Cal AD 1800 to 1940 (Cal BP 150 to 10) and  
Cal AD Post 1950

### Intercept data

Intercepts of radiocarbon age  
with calibration curve: Cal AD 1710 (Cal BP 240) and  
Cal AD 1720 (Cal BP 230) and  
Cal AD 1830 (Cal BP 120) and  
Cal AD 1830 (Cal BP 120) and  
Cal AD 1890 (Cal BP 60) and  
Cal AD 1910 (Cal BP 40) and  
Cal AD Post 1950

**1 Sigma calibrated results:** Cal AD 1690 to 1730 (Cal BP 260 to 220) and  
(68% probability) Cal AD 1810 to 1900 (Cal BP 140 to 50) and  
Cal AD 1900 to 1920 (Cal BP 50 to 30) and  
Cal AD Post 1950



### References:

#### Database used

INTCAL09

#### References to INTCAL09 database

Heaton, et al., 2009, *Radiocarbon* 51(4):1151-1164, Reimer, et al., 2009, *Radiocarbon* 51(4):1111-1150,

Stuiver, et al., 1993, *Radiocarbon* 35(1):1-244, Oeschger, et al., 1975, *Tellus* 27: 168-192

#### Mathematics used for calibration scenario

*A Simplified Approach to Calibrating C14 Dates*

Talma, A. S., Vogel, J. C., 1993, *Radiocarbon* 35(2):317-322

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## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-23.7;lab. mult=1)

Laboratory number: Beta-368385

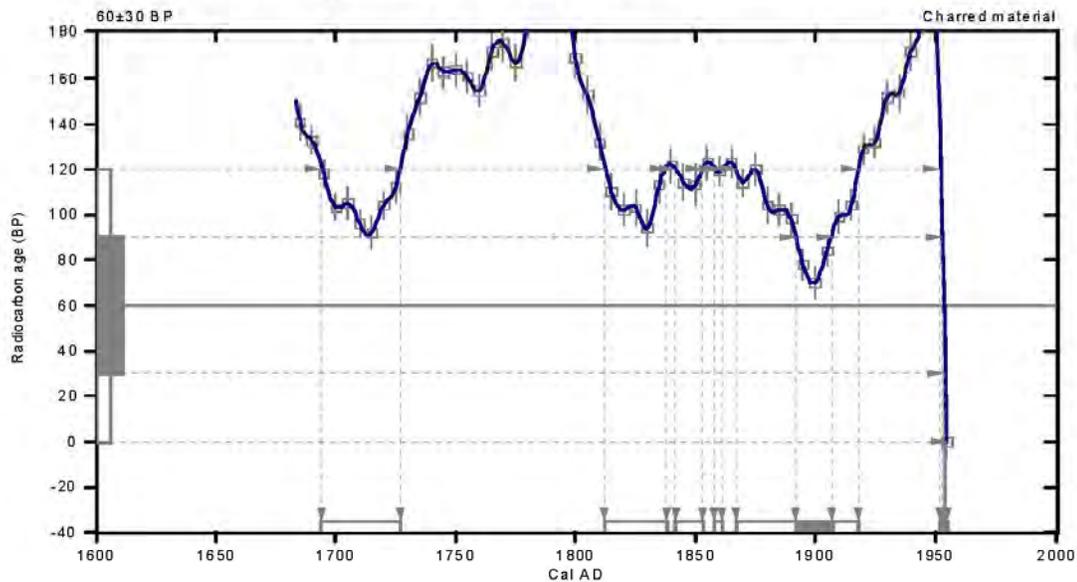
Conventional radiocarbon age:  $60 \pm 30$  BP

**2 Sigma calibrated results:** Cal AD 1690 to 1730 (Cal BP 260 to 220) and  
(95% probability) Cal AD 1810 to 1840 (Cal BP 140 to 110) and  
Cal AD 1840 to 1850 (Cal BP 110 to 100) and  
Cal AD 1860 to 1860 (Cal BP 90 to 90) and  
Cal AD 1870 to 1920 (Cal BP 80 to 30) and  
Cal AD Post 1950

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD Post 1950

**1 Sigma calibrated results:** Cal AD 1890 to 1910 (Cal BP 60 to 40) and  
(68% probability) Cal AD Post 1950



### References:

#### Database used

INTCAL09

#### References to INTCAL09 database

Heaton, et al., 2009, *Radiocarbon* 51(4):1151-1164, Reimer, et al., 2009, *Radiocarbon* 51(4):1111-1150,

Stuiver, et al., 1993, *Radiocarbon* 35(1):1-244, Oeschger, et al., 1975, *Tellus* 27: 168-192

#### Mathematics used for calibration scenario

*A Simplified Approach to Calibrating C14 Dates*

Talma, A. S., Vogel, J. C., 1993, *Radiocarbon* 35(2):317-322

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## **CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS**

(Variables: C13/C12=-28.2;lab. mult=1)

Laboratory number: Beta-368386

Conventional radiocarbon age: 90±30 BP

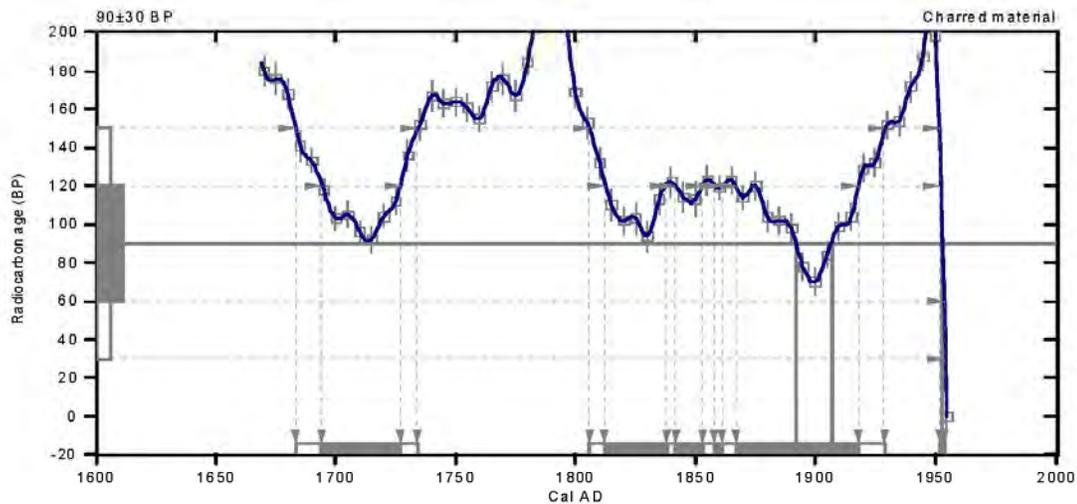
**2 Sigma calibrated results:** Cal AD 1680 to 1730 (Cal BP 270 to 220) and  
(95% probability) Cal AD 1810 to 1930 (Cal BP 140 to 20) and  
Cal AD Post 1950

### Intercept data

Intercepts of radiocarbon age

with calibration curve: Cal AD 1890 (Cal BP 60) and  
Cal AD 1910 (Cal BP 40) and  
Cal AD Post 1950

**1 Sigma calibrated results:** Cal AD 1690 to 1730 (Cal BP 260 to 220) and  
(68% probability) Cal AD 1810 to 1840 (Cal BP 140 to 110) and  
Cal AD 1840 to 1850 (Cal BP 110 to 100) and  
Cal AD 1860 to 1860 (Cal BP 90 to 90) and  
Cal AD 1870 to 1920 (Cal BP 80 to 30) and  
Cal AD Post 1950



### References:

#### *Database used*

*INTCAL09*

#### *References to INTCAL09 database*

*Heaton, et al., 2009, Radiocarbon 51(4):1151-1164, Reimer, et al., 2009, Radiocarbon 51(4):1111-1150,*

*Stuiver, et al., 1993, Radiocarbon 35(1):1-244, Oeschger, et al., 1975, Tellus 27: 168-192*

#### *Mathematics used for calibration scenario*

*A Simplified Approach to Calibrating C14 Dates*

*Talma, A. S., Vogel, J. C., 1993, Radiocarbon 35(2):317-322*

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## CALIBRATION OF RADIOCARBON AGE TO CALENDAR YEARS

(Variables: C13/C12=-25.5;lab. mult=1)

Laboratory number: Beta-368387

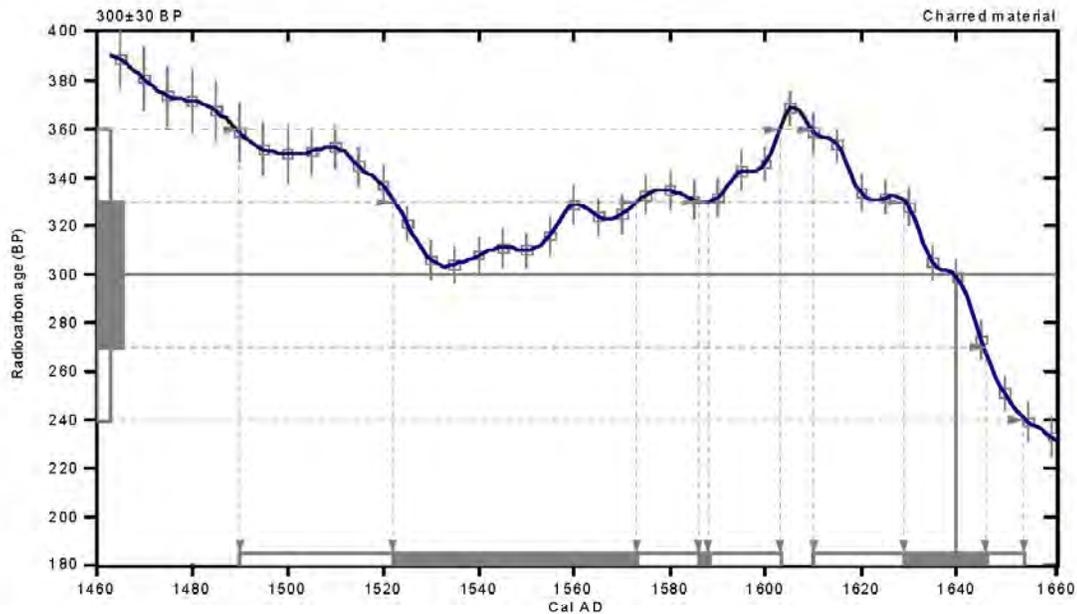
Conventional radiocarbon age: 300±30 BP

2 Sigma calibrated results: Cal AD 1490 to 1600 (Cal BP 460 to 350) and  
(95% probability) Cal AD 1610 to 1650 (Cal BP 340 to 300)

Intercept data

Intercept of radiocarbon age  
with calibration curve: Cal AD 1640 (Cal BP 310)

1 Sigma calibrated results: Cal AD 1520 to 1570 (Cal BP 430 to 380) and  
(68% probability) Cal AD 1590 to 1590 (Cal BP 360 to 360) and  
Cal AD 1630 to 1650 (Cal BP 320 to 300)



### References:

#### Database used

*INTCAL09*

#### References to INTCAL09 database

*Heaton, et al., 2009, Radiocarbon 51(4):1151-1164, Reimer, et al., 2009, Radiocarbon 51(4):1111-1150,*

*Stuiver, et al., 1993, Radiocarbon 35(1):1-244, Oeschger, et al., 1975, Tellus 27: 168-192*

#### Mathematics used for calibration scenario

*A Simplified Approach to Calibrating C14 Dates*

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# Appendix D EDXRF Analysis

## EDXRF Analysis Report UH Hilo Geoarchaeology Lab

**Sample List:** ACC 27  
08:56:22

**Analyzed:** 11/22/13

**Analysis Technique:** Linear  
07/25/13 15:35:15

**Last Calibrated:**

**Method File:** C:\...My Documents\Methods\08-13Kakaako small flakes CSH.MTH

**Software version:**

7.1 (Build 73)

### Conditions

#### Mid Zc

Voltage	28 kV	Current	Auto
Livetime	200 seconds	Counts Limit	0
Filter	Pd Thick	Atmosphere	Vacuum
Maximum Energy	40 keV	Count Rate	Medium
Warmup time	0 seconds		

#### Low Za

Voltage	6 kV	Current	Auto
Livetime	300 seconds	Counts Limit	0
Filter	No Filter	Atmosphere	Vacuum
Maximum Energy	10 keV	Count Rate	Medium
Warmup time	0 seconds		

#### Mid Za

Voltage	16 kV	Current	Auto
Livetime	200 seconds	Counts Limit	0
Filter	Pd Thin	Atmosphere	Vacuum
Maximum Energy	20 keV	Count Rate	Medium
Warmup time	0 seconds		

#### High Zb

Voltage	50 kV	Current	Auto
Livetime	150 seconds	Counts Limit	0
Filter	Cu Thick	Atmosphere	Vacuum
Maximum Energy	40 keV	Count Rate	Medium
Warmup time	0 seconds		